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ENVIRONMENTAL STATEMENT

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WEST CONTRA COSTA SANITARY LANDFILL PROJECT
REGULATORY PERMIT APPLICATION
CONTRA COSTA COUNTY, CALIFORNIA ;

Refuse and refuse disposal - California - Contra Costa co.
Sanitary landfills - California - Contra Costa co.

U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO, CALIFORNIA
MARCH 1975

SUMMARY

WEST CONTRA COSTA SANITARY LANDFILL PROJECT
REGULATORY PERMIT APPLICATION
CONTRA COSTA COUNTY, CALIFORNIA

(X) Draft Environmental Statement () Final Environmental Statement

Responsible Office: U.S. Army Engineer District, San Francisco
100 McAllister Street
San Francisco, CA 94102
(415) 556-3660

1. Name of Action: (X) Administrative () Legislative

2. Description of Action: Confirmation and approval of all existing dikes and embankments at the existing sanitary landfill project. This includes rehabilitation, completion and permanent maintenance of the dikes and embankments. Validation of the placement of all existing fill and material behind the dikes and embankments. Continuation of the sanitary landfill operations behind the existing dikes and embankments in connection with future sanitary landfill operations.

3. a. Environmental Impacts: Continuation of the fill will result in the loss of about 50 acres of levee-impounded marsh, and about 90 acres of inclosed water. Continued operation of the site will permit the removal of solid and liquid waste material from the area served by the dump. The disposal operations themselves present safety hazards to both site employees and users.

b. Adverse Environmental Effect: Loss of a waterfowl resting area and some modified marsh habitat. Continued truck traffic through North Richmond will produce noise and air emissions.

4. Alternatives: Permit denial, partial area restoration.

5. Comments Requested:

U.S. Senator - Honorable John V. Tunney
U.S. Senator - Honorable Alan Cranston
U.S. Representative - Honorable John Burton
U.S. Representative - Honorable George Miller
U.S. Department of Agriculture
Western Technical Services Center
Soil Conservation Service
Forest Service

U.S. Department of Commerce
U.S. Department of the Interior
U.S. Department of Health, Education and Welfare
U.S. Department of Housing & Urban Development
Federal Highway Administration
U.S. Environmental Protection Agency
Federal Energy Administration

State Senator - Honorable Peter H. Behr
State Senator - Honorable John A. Nejedly
State Clearing House
San Francisco Bay Conservation and Development Commission
Association of Bay Area Governments
Metropolitan Transportation Commission
Bay Area Air Pollution Control District
East Bay Municipal Utilities District
East Bay Regional Park District
Bay Area Sewage Services Agency

County of Marin
Board of Supervisors
Department of Public Works
County of Contra Costa
Board of Supervisors
Department of Public Works
Flood Control and Water Conservation District
County Health Department
City of Richmond
City of San Pablo
City of Mt. View
City of El Cerrito
City and County of San Francisco
Richmond Model Cities
Richmond Redevelopment Agency
California Chamber of Commerce
Central and North Coast Region California State Chamber of Commerce

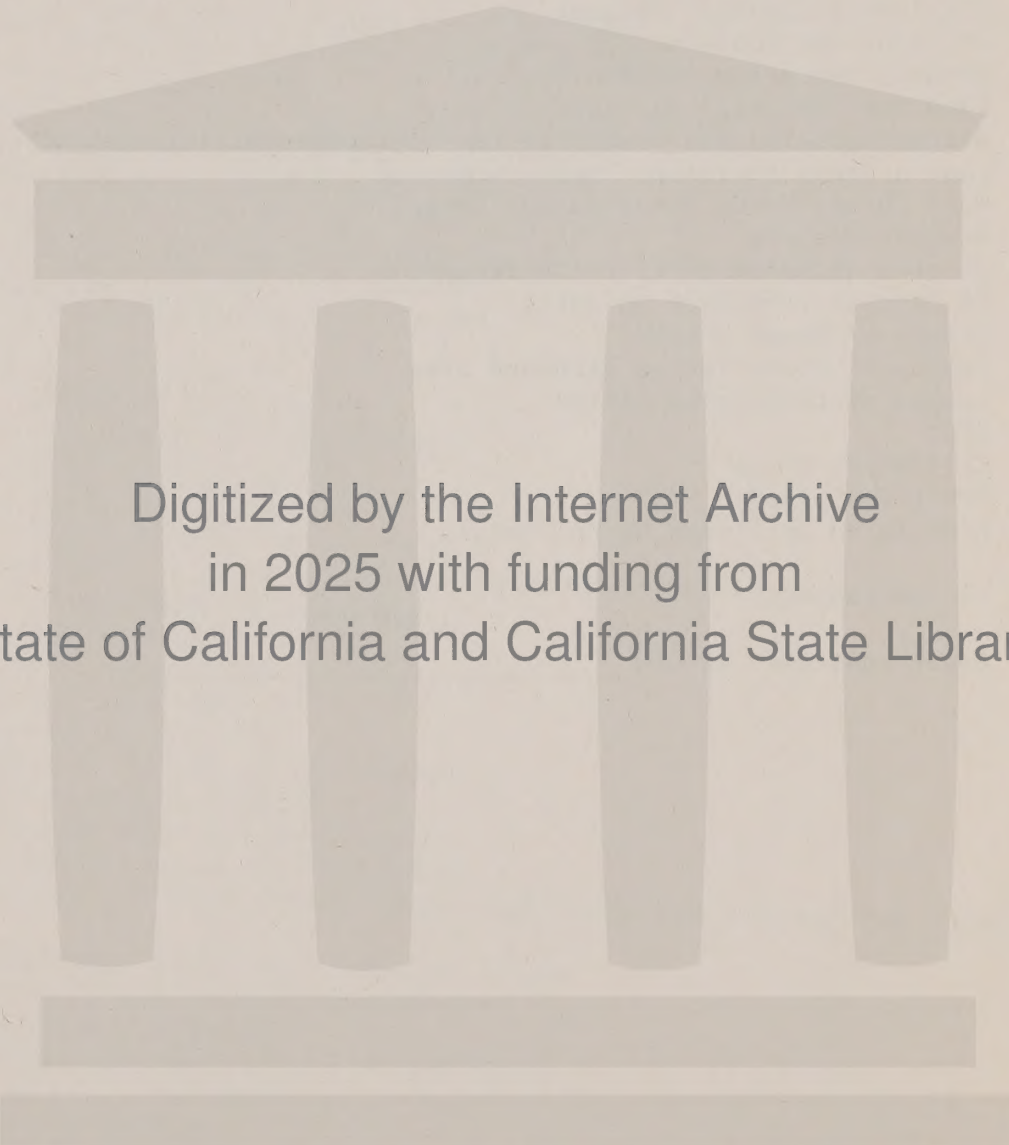
California Institute of Man in Nature
Environmental Information Center
California Tomorrow
Society for California Archaeology
Friends of the Earth
Audubon Society
Western Regional Office
Golden Gate Chapter
California Waterfowl Association

Ecology Center
Environmental Defense Fund
Sierra Club
 Loma Prieta Chapter
 San Francisco Bay Chapter
Izaak Walton League of America, Inc.
California Marine Affairs and Navigation Conference
California Wildlife Federation
Planning and Conservation League
Natural Resources Defense Council
Save San Francisco Bay Association
Northern California Committee for Environmental Information
Contra Costa Shoreline Parks Committee
West Contra Costa Conservation League
Oceanic Society
Greater Richmond Inter-faith Program
El Cerrito Committee on Aging
League of Women Voters
League of Women Voters Richmond Area
League of California Cities
SPUR
California Trout
Trout Unlimited
Associated Sportsmen of California

44 Individuals

6 MAY 1975

6. Draft statement to CEQ _____.



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ENVIRONMENTAL STATEMENT

WEST CONTRA COSTA SANITARY LANDFILL PROJECT
REGULATORY PERMIT APPLICATION
CONTRA COSTA COUNTY, CALIFORNIA

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DRAFT
ENVIRONMENTAL STATEMENT

WEST CONTRA COSTA SANITARY LANDFILL PROJECT
REGULATORY PERMIT APPLICATION
CONTRA COSTA COUNTY, CALIFORNIA

1.00. PROJECT DESCRIPTION

1.01. Proposed Project. The Richmond Sanitary Service of Richmond, California, represented by Tinning & DeLap, Attorneys at Law of Walnut Creek, California, has applied to the Department of the Army for a permit confirming and approving all existing dikes and embankments at the West Contra Costa Sanitary Landfill Project, including rehabilitation, completion and permanent maintenance of these dikes and embankments, and validation of the placement of all existing fill and material behind these dikes and embankments. In addition, application has been made for permission to continue the sanitary landfill operations behind the existing dikes and embankments in connection with future sanitary landfill operations. The letters of application can be found as Documents A-1 and A-2 in Appendix A.

1.02. The project site is located on tidelots situated midway between Point Pinole and Point San Pablo adjacent to San Pablo Bay, California (Plate 1). A portion of the project site lies within the corporate limits of the City of Richmond and a portion is in the unincorporated area of Contra Costa County.

1.03. The project site (Plates 2 and 3) consists of marsh lands, former tide lands, and bay fills, and covers an area of approximately 350 acres, about 50 percent of which presently contains waste material.

1.04. Project Authorization. The Army's authority over these lands is based upon Section 10 of the Rivers and Harbors Act of 1899. As explained in Public Notices 71-22 and 71-22(a) dated 11 June 1971 and 18 January 1972, respectively, all work undertaken in navigable waters below the plane of the mean of higher high waters (MHHW), including all new work in unfilled portions of diked areas formerly below MHHW, requires a permit from the Secretary of the Army acting through the Chief of Engineers.

1.05. In response to the provisions of the National Environmental Policy Act of 1969, Public Law 91-190, an evaluation of the impacts of a proposed activity on all aspects of the quality of the human environment is required prior to a permit application being considered for approval. This Environmental Statement addresses such an evaluation of the West Contra Costa Sanitary Landfill Project.

1.06. The Richmond Sanitary Service has filed a permit application with the San Francisco Bay Conservation and Development Commission (BCDC). Normal procedures would require that BCDC process the permit application prior to final action by the Corps. However, BCDC believes it desirable in this case for the Corps to proceed first enabling the "principle issue" to be considered, i.e., the question of the legality of the dikes (see paragraph 1.17) in view of the Corps jurisdiction (see Document A-3, Appendix A).

1.07. The Richmond Sanitary Service has applied to the Regional Water Quality Control Board (RWQCB), San Francisco Bay Region, for a discharge certification. The RWQCB has issued the Waste Discharge Requirements in its Order No. 73-40 (see paragraph 1.26).

1.08. The Richmond Sanitary Service has applied to the State Lands Commission for a lease covering an area of approximately 180 acres within State sovereign lands. The application is presently being processed, however, an approval by the Commission would require an Army permit as a prerequisite. A permit issued by the Army does not give any property rights either in real estate or material, or any exclusive privileges.

1.09. The Bay Area Air Pollution Control District (BAAPCD) exercises regulatory authority over the sanitary landfill operation (see paragraph 2.114).

1.10. California Senate Bill 5, Chapter 342 of the 1970 legislative session, established a seven-member State Solid Waste Management Board (SSWMB) within the State Resources Agency for the purpose of developing a comprehensive solid waste management program. The standards which will be developed by the SSWMB will apply to the landfill operation in the future and will serve to minimize the aesthetic and nuisance impacts caused by the landfill. These standards will also help regulate other environmental impacts caused by the project.

1.11. Senate Bill 5 also specifies that the California Department of Health (CDH) is still responsible for all aspects of solid waste management and resource recovery as they affect human health, including, but not limited to, the contamination of air, water and land; propagation of vertebrates and invertebrates which may transmit disease to man; handling and disposal of hazardous wastes; and management practices which threaten the health of solid waste employees or the general public. The CDH is required by SB 5 to develop minimum standards for solid waste handling and disposal for the protection of the public health. These standards were submitted to the SSWMB in mid-1974 for inclusion in the state policy for solid waste management. Any future regulations, operational plans, or certification requirement shall be coordinated with the SSWMB because of the irreparable nature of hazardous and solid waste operation at some disposal sites. In June 1974, the CDH published the California Guidelines for the Handling of Hazardous Wastes (Appendix B).

1.12. History of the West Contra Costa Sanitary Landfill Disposal Operation. A brief review of the history of the landfill operation is in order.

1.13. In anticipation of the adoption by the BAAPCD of Regulation 1, prohibiting open dump burning, the Richmond Sanitary Service started to assemble tide lots landward from the shoreline of San Francisco Bay commencing in July 1952 (a legal description of the precise property involved can be found in Document A-4, Appendix A.). 1 October 1958 was the date fixed by BAAPCD for cessation of open dump burning. In 1957 and throughout the early part of 1958, the old dump, owned by the City of Richmond, and located at the foot of Gertrude Avenue in North Richmond, was phased out. During this same period, the Richmond Sanitary Service acquired the tide lots and commenced its sanitary landfill disposal operation (Murdock, November 1971). The dikes along the northern boundary of the site were completed during this time. Dikes along the western portion of the site were completed during the period 1960-61 (Murdock, April 74).

1.14. Between 1960 and 1964, the Regional Water Pollution Control Board (as it was then known) established water quality requirements for the landfill operation. The Board prohibited the discharge of liquids that contained municipal, household or industrial refuse, or liquids that have been in contact with such refuse, into any surface waters of the state. In response to these requirements, the Richmond Sanitary Service advised the Water Pollution Control Board of its intention to build a water-tight dike offshore from the existing dike (Murdock, November 1971). This dike was completed during the period 1963-64 (Murdock, April 1974).

1.15. The Richmond Sanitary Service and Industrial Land Company filed an application with the U.S. Army Corps of Engineers on 23 October 1964 for permission to do certain diking and to inclose 250 acres of its tide lots in order to meet the requirements of the Water Pollution Control Board. This application was subsequently announced in San Francisco District Public Notice 65-26, (see Document A-5, Appendix A). A permit was never granted because of a number of unresolved objections, including a request by the California State Resources Agency to withhold the issuance of a permit "until a coordinated program is developed for the Bay". The BCDC subsequently came into being (see paragraph 3.04). No further action has been taken in connection with this application.

1.16. In April 1971, conservation groups requested action through the San Francisco District and the Office of the U.S. Attorney on the unauthorized dikes constructed 1960-61 and 1963-64 for which no application had been received and no Department of the Army permit had been issued. On 13 October 1971, the Richmond Sanitary Service was ordered and directed to remove the unauthorized dikes from the navigable waters of the United States (see Document A-6, Appendix A). On 19 January 1972, a cease and desist order (Document A-7, Appendix A) was issued directing the Richmond Sanitary Service to discontinue filling operations in marshland areas on the northern portion of the landfill site.

1.17. The Richmond Sanitary Service has filed an application with the BCDC. The BCDC has advised that to establish its jurisdiction over the area behind the dikes in question, it must conclude that the dikes were unauthorized and illegal and that but for such illegal dikes, the area would have been navigable water in 1965 when BCDC came into existence. Its staff and counsel anticipate that such conclusion would be attacked in local State Court and force it to establish in Court the illegality of the dikes. BCDC has strongly urged that such determination be first established in Federal Court.

1.18. On 6 October 1972, the U.S. Attorney filed in the District Court of the United States for the Northern District of California a Complaint for Injunctive Relief against the Richmond Sanitary Service, et al. On 13 December 1972, the Richmond Sanitary Service applied for a Department of the Army permit, for which this Environmental Statement is being prepared. Action by the Court is being held in abeyance pending the disposition of this permit application.

1.19. Disposal Site and Waste Classification. The State Water Resources Control Board (SWRCB) has established a disposal site and waste classification system (SWRCB, 1974) on a statewide basis. The classification of disposal sites is based upon the geologic and hydrologic features of the disposal area and the capability for protection of surface and groundwater quality. The categories of wastes is based upon the threat that the type of waste material presents to water quality.

1.20. Group 1 wastes consist of or contain toxic substances and substances which could significantly impair the quality of usable waters. "Toxic" here means lethal, injurious, or damaging to man or other living organisms including plants, domestic animals, fish and wildlife. Group 2 wastes consist of or contain chemically or biologically decomposable material which does not include toxic substances nor those capable of significantly impairing the quality of usable waters. Group 3 wastes consist entirely of nonwater soluble, nondecomposable inert solids.

1.21. Class I disposal sites are those at which complete protection is provided for all time for the quality of ground and surface waters from all wastes deposited therein and against hazards to public health and wildlife resources. Class II disposal sites are those at which protection is provided to water quality from Group 2 and Group 3 wastes. Class III disposal sites are those at which protection is provided to water quality from Group 3 wastes by location, construction, and operation which prevent erosion of disposed material.

1.22. Any non-radioactive waste may be disposed of in a Class I site. Any Group 2 or Group 3 wastes may be disposed of in Class II sites. Only Group 3 wastes may be disposed of in Class III sites.

1.23. Selected sections of Subchapter 15 to Chapter 3 in Title 23 of the California Administrative Code are found as Appendix C. The general guidelines and minimum standards for disposal site and waste classification are listed.

1.24. The 350-acre area is broken down into the following areas on Plate 2:

a. Area IP (9 acres) is presently used for disposal of Group 1 liquid wastes. Area IP and IB (10 acres) are proposed for the use of Group 1 wastes (see paragraph 1.28).

b. Areas IIA (85 acres) and IIB (95 acres) are used for disposal of Group 2 and Group 3 wastes.

c. Area IIC (50 acres) is a former salt marsh.

d. Area IID (30 acres) is a brackish pond.

e. Area IIE (60 acres) is a salt water pond.

1.25. Sanitary Landfill Operation. The nature of the material deposited at the landfill site (with the exception of the areas for the liquid waste and barrel storage areas) is the usual sanitary waste collection from residential householders, such as, garbage, rubbish and swill, and from commercial and industrial establishments. The sanitary landfill operations commenced in 1957 (see paragraph 1.13) and have continued ever since. All of the material deposited in the site are of Group 2 and Group 3 wastes, with the exception of those materials deposited in the limited areas set aside for liquid wastes and barrel storage. The wastes in these limited areas are of a Group 1 type.

1.26. The RWQCB has issued the Waste Discharge Requirement in their Order No. 73-40. This order specifies the construction and operation of the Class I sites to prevent the occurrence of seepage into underlying groundwater or adjacent surface water. The order establishes interim remedial measures to improve the operation of the Class II areas, and requires development of detailed construction and operation plans for the existing and proposed Class II disposal areas. In addition, the order establishes monitoring and reporting procedures to assure safe operation of the project until all fills are completed. RWQCB Order No. 73-40, the interim remedial measures for the Class II areas, and suggested Procedures and Specifications for Operation of the Barrel Stage Area can be found in Appendix D.

1.27. The occurrence of fire is a continuing threat at the sanitary landfill site (see paragraph 2.112). Fires in late 1972 and 1973 gave rise to a criminal action filed in the San Pablo Branch of the West Municipal Court. The action was completed on 29 April 1974. Sixteen requirements imposed by the Court are presently being carried out by the Richmond Sanitary Service and are listed in Appendix D.

1.28. Construction of Class I Areas. Detailed recommendations for the construction of the Class I areas were prepared by Cooper, Clark and Associates (August 1972) and were made part of the RWQCB Specifications (see Appendix D).

1.29. The location of the existing Class I liquid waste disposal area (Area IP) and the previously proposed barrel storage area (IB) are shown on Plate 2. Area IB was to be used as a disposal area for Group 1

waste contained in unwashed barrels and containers which have been used for pesticides and other toxic materials. Current plans are now to relocate the existing Class 1 liquid waste disposal area to the general vicinity of Area IB and locate the new barrel storage area in the vicinity of Area IP. Revised construction plans and specifications for these areas are presently under preparation. The following are general specifications prepared by Cooper, Clark and Associate (December, 1971; April, 1972; and August 1972) for construction of the Class I areas.

1.30. The liquid waste disposal pond (Area IP) has been in use for many years. An inclosing dike should surround this future barrel storage area and should be maintained at least 100 feet from the adjacent San Pablo Sanitary District effluent channel and all property lines. Barrels will be stored to a maximum height of 8 feet. The selected new disposal pond (Area IB) is 150 feet from the adjacent property line and at least 100 feet from the effluent channel.

1.31. Prior to construction of the perimeter dikes, all existing sloughs and ditches within a distance of 100 feet outboard of the dikes shall be filled with bay mud to the level of the adjacent natural ground. Before filling, the sloughs and ditches shall be stripped of major vegetation and all foreign matter. Provided that construction equipment or other vehicular traffic will not have to traverse the filled ditches or sloughs immediately after filling, the bay mud fill need not be compacted. Filling of the sloughs and ditches shall be accomplished using excavated bay mud dumped in a manner so as not to create voids. It will be necessary for this fill material to develop a dry crust before it can support even lightweight construction equipment.

1.32. All perimeter dikes are to be established directly on the natural bay mud. Therefore, in areas presently blanketed by sanitary fills, excavations will be required. The excavations shall have side slopes no steeper than 2:1 (horizontal to vertical). Where the surface elevation of the existing sanitary fills is above 8 feet (MSL=0 Datum), the surface elevation shall be lowered to elevation 9 feet for a minimum distance of 30 feet behind the top of the excavations. The bottom of the excavations shall have sufficient width to permit construction of the necessary dike section. The dike width will depend on the elevation of the bay mud surface. All natural vegetation and foreign matter shall be removed from the bottom of the excavation so as to provide an impervious bond between the natural bay mud and the dike fill. All excavated sanitary fills shall be stockpiled for later reuse as backfill against the dike slopes or properly disposed of on-site. Group 3 materials shall be stockpiled separately for reuse as buttress backfills against the inboard slopes of the dike, as discussed below.

1.33. Borings drilled in and adjacent to the disposal areas indicate that groundwater is present in the existing sanitary fills (see paragraph 2.52). The groundwater could seriously interfere with the necessary excavations and dike construction. It may be necessary to excavate perimeter drain ditches around the boundaries of the two construction

projects in order to drain the water from the sanitary fills within the construction areas. Since the groundwaters within the sanitary fills are contaminated by contact with the wastes, all water collected in either the perimeter drain ditches or in other excavations could be sprayed on the surface of the adjacent sanitary fills. In no event shall the collected water be discharged into the nearby effluent channel or otherwise off of the site. Provided that the water within the adjacent sanitary fills is properly drained, it is not anticipated that the excavation into the bay mud for the barrel disposal area will encounter major amounts of groundwater. However, the excavation shall be sloped to a sump, and all collected water shall be disposed of as described above.

1.34. Perimeter dikes shall have side slopes no steeper than 1:1 and shall consist of impermeable bay mud compacted to at least 80 percent compaction. In order to provide the required impermeable barrier, the minimum crest width of the dike shall be 5 feet. However, if necessary to facilitate construction, the crest width may be increased, but the recommended minimum side slopes ratios must still be maintained. The base of the dike shall extend the full width of the excavation. In areas that were previously blanketed by sanitary fills, the dikes shall be constructed to elevation 9 feet. In other areas, the dikes shall be constructed to elevation 10 feet. Following the necessary dewatering and excavations along the dike alignments, the exposed subgrade shall be allowed to dry until a sufficient crust is developed to provide a stable working surface.

1.35. Prior to placement as compacted fill, the excavated bay mud shall be dried to a workable moisture content. Following moisture conditioning of the excavated material, an approximately 12-inch-thick lift of fill shall be placed on the crusted dike subgrade, using lightweight equipment to prevent displacement of the underlying soils. The fill shall be compacted to at least 80 percent compaction. If the 12-inch-thick lift of fill is insufficient to support light construction equipment, the initial lift thickness shall be increased as directed by the Soil Engineer. During placing of the first fill lift, end dumping ahead of the fill shall not be permitted. Fill material shall be dumped well behind the working face and spread by lightweight bulldozers.

1.36. In order to minimize the possibility of instability of the dike developing during construction, the adjacent excavations shall be backfilled to at least elevation 4 feet when the dike is raised to elevation 5 feet. The inboard backfill shall consist of selected Group 3 materials, while the outboard backfill may consist of either Group 2 or Group 3 materials. The backfill shall be placed in lifts not exceeding two feet in thickness and it shall be compacted by "tracking" with the construction equipment. After completion of the dikes, the adjacent excavations shall be similarly backfilled to at least elevation 8 feet. The slope of these backfills away from the dike shall be no steeper than 6:1.

1.37. Prior to the start of general excavation and dike construction, a test section on the order of 100 to 200 feet long shall be excavated and a test dike constructed. Based on the data obtained from the test section, the foregoing specifications will be revised, if required.

1.38. Construction of Class II Areas. The perimeter dikes and embankments were not uniformly constructed. In general, the quantity, nature and type of material consisted of demolition debris, such as dirt, rock, concrete, steel, wood and bay mud excavated from the inboard side of the levee (Murdock, February 1974). The existing dikes and embankments were constructed using trucks for hauling the materials, dozers for compacting the materials, and dragline for sealing and face the dikes and embankments with bay mud (Murdock, 29 August 1974).

1.39. The RWOCB has required that the existing Class II area be investigated to determine the adequacy of the perimeter dikes and the acceptability of present disposal operations, and to develop methods of upgrading the site, if required, to meet current pollution control requirements. It would be difficult at this time, without an expensive investigation, to determine the precise measurements of the dikes along and around the entire perimeter of the property, with the exception of the dike along the southwesterly perimeter, since in most instances the dikes are contiguous to and contain portions of the area which have been filled. Since the extent of future disposal operations at the site will depend on the results of matters pending before BCDC and the Corps of Engineers (see paragraph 1.17), an agreement was reached between the RWOCB staff and Cooper-Clark & Associates (August 1972) that a detailed soil investigation, involving subsurface exploration, laboratory testing, and engineering analysis, was not warranted at this time. Therefore, construction plans for the proposed new Class II disposal areas (Areas IIC and IIE) have not been formulated. The RWOCB staff did request that interim soil engineering studies be performed to provide some assurances that the existing disposal operations are not causing pollution of adjacent water or creating other health hazards. These studies (Cooper-Clark and Associates, August 1972) resulted in recommendations for remedial measures in the existing areas (see Appendix D).

1.40. Cover Material. No record has been kept by the Richmond Sanitary Service of the source of cover material nor of how many truck-loads have been brought in per day or per week. However, most of this cover material comes in from local independent truckers in West Contra Costa County. Some treated sewage sludge (water content less than 50 percent) has been hauled from time to time from the East Bay Municipal Utility District sewage treatment plant located near the Bay Bridge off-ramp in West Oakland, and some has been obtained from time to time from the San Pablo Sanitary sewage plant which is immediately adjacent to the landfill site. This treated sewage sludge is spread out and thoroughly dried and then used for cover material pursuant to procedure established by the RWOCB. On rare occasions the Richmond Sanitary Service has purchased cover material from Quarry Products, situated near the old San

Rafael Bridge site in Richmond. Other cover material is mined from the upland property on the landfill site (Murdock, November 1974).

1.41. Plans for the final fill covers have not yet been formulated, however, they will probably include at least a foot of compacted impervious material, overlain by subsoil and topsoil for landscaping. The subsoil will probably be selected, highly pervious material to assure adequate drainage of excess rainfall and irrigation, and drain tile will probably be provided in major swales to facilitate drainage. Minimum slopes of the fill covers will probably be one percent or greater. The concept of the fill cover seal and drainage provision is shown on Plate 4.

1.42. Future Site Development. The Richmond Sanitary Service plans to continue the present sanitary landfill operation for the estimated life of the site (see paragraph 2.94). Following completion of the landfill, the long-range plans have not materialized except in conceptual form. In 1965 the engineering firm of Arthur D. Little of San Francisco, California, was employed to develop a report for the development of the properties held by the Richmond Sanitary Service. These total holdings comprise some 900 acres of tidelots on the waterfront of San Francisco Bay. The 350 acre landfill site, presently under consideration, is part of this 900 acres. In 1970, the planning and consulting firm of Herman D. Ruth and Associates of Berkeley, California, was employed to update the Arthur D. Little report, with particular reference to the part the East Bay Regional Parks District might play in the ultimate stewardship of the property (Murdock, July 1971).

1.43. Using a development plan, the continuation of landfill operations could be programmed to benefit the public and owners alike. With this in mind, a Development Plan Concept (Herman D. Ruth and Associates, 1971) was proposed. The major objectives of the plan were to establish a waterfront park usable by all the people in the region; to establish a plan that will work in concert with the necessary sanitary landfill operations; to establish a variety of uses so that many kinds of interests and activities will be available; to build the park with little or no cost to the taxpayer; to preserve wildlife habitats; to improve and increase wildlife habitats; and to improve and increase public access to the Bay. Being adjacent to the Bay, the plan concept is water-oriented, but not exclusively so. The size and regional nature of the parks suggested to the planner a number of facilities to serve a wide range of interests. About a third of the 900 acre site would be left in its natural state such as tidal marsh or in bodies of water such as swimming lagoons, lakes and a marina (see Plate 5). It is again pointed out that the 350-acre sanitary landfill operation presently under consideration is only a part of the 900 acres covered by this Development Plan Concept. Any development in this area would require a Corps permit. No permit applications have been received for this larger area, nor is the San Francisco District aware of any plans (other than the above concept) to develop the area.

1.44. Inter-relationship and Compatibility of the Project with Existing or Proposed Corps or Other Agency Projects. The federally related projects in the immediate vicinity of the landfill site are the Wildcat - San Pablo Creeks Water Resources Project sponsored jointly by the U.S. Army Corps of Engineers and the Contra Costa County Flood Control and Conservation District, and the Richmond Model Cities Program administered by the Department of Housing and Urban Development.

1.45. The Wildcat - San Pablo Creeks Water Resources Project is presently under study (Department of the Army, August 1973). As proposed, the project would result in independent channel improvement on Wildcat and San Pablo Creeks (see Plate 6). No construction on either creek is proposed in the salt marshes. Improvement to Wildcat Creek would include a 250-foot wide earthen floodway from the salt marshes to the Verde School, including trails, picnic areas, a water impoundment, and landscaping; and a covered concrete culvert past Verde School, and an open trapezoidal concrete channel upstream to approximately Vale Road, including trails and landscaping. Improvements to San Pablo Creek would include an earthen floodway to the vicinity of the Sante Fe Railway tracks which will subsequently be allowed to revert to natural vegetation; and floodflow diversion through a concrete culvert from 17th Street under Road 20 to the vicinity of Giant Highway. The existing channel for the diverted reach would remain unimproved and would carry flows to channel capacity.

1.46. No adverse effects on the productivity of the marshlands and mudflats are anticipated from increased residential and industrial growth resulting from the water resources project. Although there will be a limited curtailment of silt deposition resulting from concrete channelization, the effect on the marshland will not be great. Tidal waters are not sealed off from the marshland allowing replenishment of materials in addition to run-off from the Creeks (Department of the Army, April 1973).

1.47. The permit application submitted to the Corps by the Richmond Sanitary Service does not call for an increase in the size of the present landfill site and there will be no expansion of the exterior levees. However some modification to the levee and bridge in the vicinity of San Pablo Creek may be necessary to allow the proper flood flow of 5,100 c.f.s. (see paragraph 2.70) to spread over the remaining marsh into the Bay.

1.48. The Model Cities Program is an effort to concentrate public and private resources in a comprehensive five-year attack on the social, economic, and physical problems of slum and blighted neighborhoods (see paragraph 3.18).

1.49. The portion of the Richmond Model Neighborhood area that is in the vicinity of the landfill site is the community of North Richmond. The relationship between the landfill operation and the community of North Richmond are discussed elsewhere in this report (see paragraphs 2.04, 2.85, 2.100, 3.18, 4.40 and 4.54).

1.50. Fish and Wildlife Mitigation. The Richmond Sanitary Service has not offered any mitigation for the landfill operation. The Fish and Wildlife Service has recommended restoration of those areas of the project site that have not been filled (Reese, 1975). It has been recommended that (see Plate 7):

a. The levee at the southern edge of the remaining 55 acres of marsh in Areas IIC and IB be breached as needed to restore tidal action to this area;

b. The levees at the west end of Area IID and at the north edge of Area IIE be removed completely to restore tidal action to the 100 acres of mudflats in those areas;

c. If the levee at the western edge of Area IIE could be used to divert tidewater into the Area IIC marsh, the levee should be retained and maintained;

d. If the levee along the western edge of Area IIE is not of value for directing tidal flow into the restored marshland, the levee should be converted to a bird resting area;

e. The existing fill (Area IIB) should be sealed to prevent leachate from entering San Pablo Bay;

f. At the earliest possible date a public park should be built on top of the existing fill;

g. Foot and bike tracks should be built along the interface of the park's filled lands and the tidal marshes;

h. A nature and interpretive center should be constructed;
and

i. No additional fill should be authorized for the triangular tracts of land on the east bank of San Pablo Creek.

1.51. Some of the engineering and environmental considerations involved with restoration are discussed in paragraph 6.07.

2.00. ENVIRONMENTAL SETTING WITHOUT THE PROJECT

2.01. Regional Location. The San Francisco Bay Area is one of the largest metropolitan areas of California and is the business and financial center of Northern California. The nine counties (Marin, Sonoma, Napa, Solano, Contra Costa, Alameda, Santa Clara, San Mateo, and San Francisco) bordering San Francisco, San Pablo and Suisun Bays, comprises the economic and geographical unit known as the San Francisco Bay Area. The entire water area is familiarly called San Francisco Bay, or just "the Bay".

2.02. The Bay is a flat valley which was flooded by the rising sea level following the last continental glaciation. As a result, most of the Bay is very shallow and is characterized by broad tidal flats and marshlands along its perimeter. Such tidal flats and marshes exist along the Contra Costa County shore, especially in the area by North Richmond. Much of the City of Richmond itself is built on former marshlands that have been filled over the years.

2.03. The disposal site encompasses approximately 350 acres behind dikes in the tidelots along the waterfront of San Pablo Bay between San Pablo Creek to the northeast and Wildcat Creek to the south.

2.04. Existing Land Uses. The landfill site is located at the foot of Parr Boulevard partially within the Richmond city limits and partially in the unincorporated area of Contra Costa County. Immediately adjacent to the site is the built-up community of North Richmond, itself located one-third within the City of Richmond and two-thirds within the County. North Richmond is a residential community of some 4,400 people, surrounded by industry and physically isolated from both Richmond and San Pablo.

2.05. The North Richmond Area comprises the common floodplain of Wildcat and San Pablo Creeks. More than half of the area is salt water marshes and tidal mudflats. The eastern half is roughly divided into residential uses in the southern portion and light industry and agriculture in the north (see Plate 8). Major industries in the area include Standard Oil Company, Allied Chemical Corporation, Chevron Chemical Company, and the Richmond Sanitary Service. Most of the other industries are small-scale. In addition, there are some warehouses, a large number of auto wrecking yards, and a substantial nursery industry. The closest residential area to the site is nearly a mile away. The North Richmond land use percentage breakdown is as follows:

| | |
|--------------------|-------|
| Industrial | 18.1 |
| Residential | 10.8 |
| Sanitary Land fill | 18.3 |
| Vacant | 43.5 |
| Other | 9.3 |
| TOTAL | 100.0 |

Source: Contra Costa County Planning Department, 1971.

2.06. The names and addresses of the owners of property adjacent to the landfill site are listed in Document A-1, Appendix A.

2.07. Pre-project Description. This Environmental Statement is an evaluation of the environmental impacts not only for proposed continuation of the landfill operations but also for completed work. Therefore, while the present project area and future impacts will be discussed in detail, it is important to make a comparison between site conditions and those conditions that existed in the area prior to the project.

2.08. In the past 120 years the Bay and its margins have undergone many significant changes. In the mid-1800's the Bay to the outer marsh edge covered 476 square miles. Today, the Bay covers only 423 square miles, an 11 percent reduction. Historically, the marshlands have covered as much as 313 square miles marginal to the Bay. Modern (1968) tidal marshland consists of 125 square miles, a 60 percent reduction (Nichols and Wright, 1971).

2.09. San Pablo Bay is a major element of the tectonically produced San Francisco Bay estuary. The project site is located within that portion of San Pablo Bay which is east of a line running northeastward from Point San Pablo to Pinole Point. The area east of this line consisted of extensive mudflats bordered by regularly flooded salt marshes (Shaw and Fredine, 1971). Due to the shallowness of the water in the area, approximately 50 percent of the mudflats were exposed at mean lower low water.

2.10. The marsh and mudflat area was a remnant of a tideland complex that occurred along an inferred fault between the project site and the San Pablo Hills (BCDC, 1969). In the 1850's the original tideland complex was so extensive that San Pablo Hills was often an island and was the major wetland area on the San Pablo Bay front of Contra Costa County. Through accretion the bayward edge of the marsh grew considerably between 1856 and 1959. However, the bayward edge of the marsh remained essentially unmodified by man during this period.

2.11. Plate 9 shows the historic margins of marshlands in the Richmond area. Plate 10 represents the site area in 1947 and Plate 11 represents the area in 1968. Comparison of this sequence of plates shows that decrease of the marshes in this area has come from two causes. Urbanization and expansion of Richmond has pushed the marsh line westward. The landfill has covered approximately 109 acres of marshland and 243 acres of mudflats. Where once there was continuous marshland of almost 500 acres extending from the north side of San Pablo Creek to south of the San Pablo Channel, the landfill operation has almost completely divided the area into two smaller marshes.

Vegetation and Wildlife

2.12. Productivity of San Pablo Bay. The basis of productivity within San Pablo Bay is plant photosynthesis which combines the inorganic materials through the action of sunlight on chlorophyll to produce the organic matter of phytoplankton and higher plants.

2.13. The most productive zone in many estuaries is the zone of transition including the intertidal and adjacent shallow subtidal areas (W.E. Odum, 1970). In general, the productivity of an estuarine area is closely related to the ratio of shoreline to water area -- the longer the shoreline per unit of water area, the greater the potential or actual biological productivity. Where favorable ratios occur, vegetation productivity is favored and a food-rich habitat develops providing a nursery area for many fish and shellfish species. The surface area itself is important because the distribution of solar energy which drives photosynthesis is a function of the surface area.

2.14. Tidal action also affects vegetative production by decreasing or increasing the exposure of microscopic mud algae, marsh plants, and phytoplankton to sunlight as the volume of water changes over the marshes and mudflats. Tidal action ties together the elements of the intertidal and subtidal systems where nutrients from incoming food are regenerated and recycled or stored; it is also in this zone that vitamins and growth regulators are manufactured (E.P. Odum, 1971). Tidal water circulates food and oxygen, as well as pollutants, to the various parts of the estuary, and as it recedes, it removes manufactured food to be redistributed to other parts of the estuary. This receding water also removes and dilutes wastes.

2.15. An additional factor affecting the annual production of an estuary is its characteristic of maintaining a variety of species each of which contributes to the annual production figure at a different season of the year. It is this diversity of species, limited as it is, that is important because it permits an estuarine system to convert the sun's energy into food all year long (E.P. Odum, 1971).

2.16. The most important group of plants contributing to primary productivity are the phytoplankton, algae growing on the mudflats, and pickleweed and salt grass in the marshlands. Animals, the secondary productivity consisting of zooplankton and other herbivores, feed on phytoplankton and algae; and they, in turn, are preyed upon by fish and other carnivores, thereby transferring energy and material throughout the food chain.

2.17. Another important segment of estuarine productivity are the dead plant and animal material from the marsh and tidal communities which are decomposed by microbial and scavenging components of these communities. The released nutrients, as well as the undecomposed organic materials, are distributed by tidal currents throughout the estuarine ecosystem.

2.18. Wetlands. Wetlands or marshes are waterlogged lands which may be covered periodically or permanently with shallow water. Salt marshes adjacent to the bay are areas of intertidal rooted vegetation which are alternately inundated and drained by the rise and fall of the tide. The vegetative composition of the resultant salt marsh is controlled by the degree of saturation, depth, and duration of flooding, and the salinity of the water supply. In San Pablo Bay, marsh complexes with their network of vegetation and interlaced meanders, developed where there were broad low-gradient flats of soft sediment not too strongly stressed by waves or currents. Major marsh areas are located at the mouth of San Pablo Creek, Castro Creek, and Wildcat Creek (a tributary to Castro Creek); the marsh complex at the mouths of Castro Creek and Wildcat Creek form one inseparable complex. A marsh border can be found along almost the entire shoreline between the mouth of Castro Creek north to Point Pinole. The majority of the marsh vegetation found within the project area consists of pickleweed with scattered patches of cordgrass. Table 1 is a partial list of wetland plants found in these marshes.

2.19. Salt marshes represent one of the most productive types of natural habitat found in the United States. This stems in part from the primary production of salt marshes or tidal marshes being programmed for year round production and in part to the secondary production that occurs in the marsh. A tidal marsh's main contribution to an estuary's food chain is the decaying marsh vegetation, the organic detritus. While this detritus is valuable in itself, it becomes more valuable after becoming covered with epiphytic micro-organism and converted to the tissue of nitrogen fixing decomposer organisms (W.E. Odum, 1970). These epiphytic micro-organisms provide much of the useful nutrition which serves as a major energy source for estuarine organisms such as: amphipods, isopods, mysids, small crabs, insect larvae, certain shrimp, and some fishes (W.E. Odum, 1970).

2.20. In this as in other elements of the shallow water production zone, the rate of primary production exceeds the rate of community respiration or consumption (E.P. Odum, 1971). It is the subsystem which contributes the needed food energy and nutrient subsidy to the waters over the mudflats, to the mudflats, and to the deeper waters of the San Pablo Bay and the remainder of the San Francisco Bay-Delta System. Evidence indicates that waters bordered by marshlands support more and a greater variety of fish and other aquatic life than non-marsh bordered areas. In addition to this, marsh plants also appear to reduce air pollution because some species are capable of converting carbon monoxide into carbon dioxide, a non-toxic compound (BCDC, 1969) (see paragraph 2.126). This shallow water production zone is also a most easily destroyed element in the Bay system because it occurs at its fringe closest to man's activities.

2.21. Plankton. The term "plankton" is applied to all of those plants and animals living freely in the water and which, because of their small size or feeble powers of locomotion, are passively drifted by the currents. Phytoplankton are members of a group of plants called algae. Utilizing radiant energy, these microscopic plants assimilate inorganic chemicals and convert them to cell material which, in turn, are consumed by various species in the next trophic level. The phytoplankton, therefore, are the base of the food chain in estuarine waters, and their existence is essential to all life in the estuary. Suspended with the phytoplankton are animals or zooplankton organisms, which graze upon the minute plants. The zooplankton can be divided into two groups: the animals which live and grow to maturity and breed as drifting organisms; and the larval stages of many benthic and nektonic animals which spend a short or a long larval period in the plankton. These animals, in turn, are consumed by animals in the next trophic level and thus form the next important group of organisms in the food chain of San Pablo Bay. Individually insignificant, collectively the phytoplankton and zooplankton are the most important group of organisms in the San Pablo Bay estuary ecosystem.

2.22. Data (Reese, 1975) indicates that plankton production, although cyclic, is high from early spring to early summer in the project area. Significant numbers of fish eggs and larva have been collected in the project area. A list of planktonic organisms found in the project area is shown in Table 2.

2.23 Benthic communities. Benthos are an important biotic community of San Pablo Bay. They are an integral part of the food web of the more inclusive marine and estuarine communities. This group of animals includes most of the organisms that live on the bottom such as crabs, barnacles, snails, or in the bottom sediment such as clams and worms.

2.24. Two important functions accomplished by benthic detritus-algal feeders include the concentration of freely circulating detritus by these filter feeders into pseudofeces which can be picked-up more efficiently by deposit feeders; and the conversion of plant material, detritus, and fresh algal cells, into animal tissue which can be utilized by predators, such as, shorebirds.

2.25. Bottom fish feed heavily on benthos, and such fish and some of the larger benthic animals are food for larger fishes. Thus, benthos are a critical link between the primary producers, the plants, and the non-herbivorous fish and wildlife of an estuary. A list of benthos found in the project area are shown in Table 3.

2.26. Mudflats. Mudflats and mudbanks are the unvegetated bay bottom when the tide is out; they are the tidelands between the lowest water mark and the edge of the bay's tidal marsh vegetation. These flats are the key transitional element which combine the food sources from tidal marshes and the bay water into a form which can be used by the fish and wildlife of the area (Harvey, 1966). San Pablo Bay contains extensive mudflats; one such area being from Point San Pablo to Point Pinole. The flats of the project area are composed of mud and sand in various percentages and support populations of microscopic algae and a variety of burrowing animals Table 3. Algae are an important ecological component of the mudflats. For example, it appears that the benthic detritus algal consumers, in order to grow and reproduce, require in their diet 10 to 20 percent fresh algal cells in the form of diatoms or filamentous green and blue-green algae (W.E. Odum, 1970).

2.27. A by-product of the high photosynthetic production of the mudflat algae is oxygen. Oxygen is released both into the water and air where it benefits man as well as fish and wildlife. This by-product of algae, oxygen, is also important in the abatement of pollution in the Bay's water (BCDC, 1969).

2.28. The microbial activity of mudflats must also be recognized. The microbes of the mudflats participate in the sulfur, nitrogen, and phosphorus cycles of the Bay's system by breaking down organic detritus in the sediments into usable forms such as ammonia, nitrate, and organic phosphate which can be used by plants.

2.29. Existing ecosystems. There are no unmodified, natural vegetation or habitat areas remaining within the 350-acre project area. Area IIC is impounded, highly modified marsh, and Areas IID and IIE are diked ponds with modified production capability (see Plate 12). The remaining 190 acres have all been used for waste disposal, much of it to considerable depths.

2.30. The marsh in Area IIC is in the inner brackish impoundment. This remnant is a diked off portion of the larger remaining marsh to the south. Vegetation in the area is predominantly pickleweed with other invading species, also tolerant of the brackish conditions, in the higher regions. No direct tidal flushing occurs in the ponds other than by small amounts leaking through the dikes. Some exchange of baywater may occur by seasonal high tides flooding over the lower portions of existing dikes. This marshy area is poorly productive, gravely modified and degraded from its original state as a tidal estuarine marsh (Arend, 1973). The modification and degradation of this area is the result of the levee, asphalt roadway that encompasses area IB, IIC, IID, and IIE. A highly productive tidal marsh was isolated by this levee and became non-tidal, polluted with leachates, and periodically inundated with

excessive fresh water which is poisonous to many brackish-water organisms. Further, the physical barrier of the asphalt-topped levee decreased wildlife recruitment of the inclosed marsh and increased the vulnerability to predation of man of the tidal marsh wildlife species. The loss of tidal flow decreased the area's productivity, as evidenced by the elimination of the strand lines that are the habitat for amphipods (scuds), which are a major food base organism in the Bay's tidal mudflats (Arend, 1973). Wildlife living and feeding in the marsh area consists of raptors and other avian species (see Tables 4 and 5) and small mammals (see Table 6).

2.31. Two large, inclosed ponds are located in the southwesterly portion of the project area (Areas IID and IIE). These ponds were formed by constructing the inclosing levees over what was originally marsh and mudflat areas. The impoundments were constructed to provide additional refuse disposal area.

2.32. The eastern pond, located in Area IID, is separated from the western pond by a north-south running dike. The water in this pond is brackish, with a specific conductivity of about 22,000 micromhos per centimeter (Micromhos per centimeter are an indication of the amount of total dissolved solids in parts per million of approximately the same magnitude).

2.33. The southern shore of the eastern pond is the impounded marsh, Area IIC, with the north edge in contact with the demolition debris fill of Area IIB. Bottom mud samples from near the center of the pond reveal no living invertebrates. In comparison with other samples from the western pond and along the shore, this indicated an extremely poor quality of the bottom substrate (EAE, 1973). Benthic analysis are shown in Table 7.

2.34. Birds noted on the pond during numerous field surveys include various gulls, coots and ducks. The gulls numbering in thousands, appear to be mainly resting and occasionally fighting over scraps of garbage brought over from nearby fill operation. Other birds within the diked impoundment include various puddle ducks and shorebirds using the vegetation along the southern marshland. The feeding potential for shorebirds and waterfowl around the pond is probably entirely within the marsh area (EAE, 1973).

2.35. The westernmost pond, in Area IIE bordering the Castro Creek Channel has been used to a small extent for disposal of demolition debris, but about 60 acres of water remain. Water depths are three to five feet and the salinity is nearly the same as the adjacent Bay water. This pond was much less saline during the height of the 1972-1973 rainy season, but this freshwater influence was soon offset by evaporation and

exchange through the leaky dikes. Bottom mud samples from this pond indicate a depressed benthic invertebrate population (EAE, 1973). Only about 360 annelid worms per square foot were found as compared to 500-5,000 annelids in nearby mudflats. The pond's mud was also malodorous, indicating low dissolved oxygen, and an oil film was noted in each sample taken. These analyses are shown in Table 7.

2.36. Many species of birds use the shelter pond seasonally as a resting place and possible feeding area (see Table 4 and 5). Due to the slope of the dikes and depth of water, feeding in the pond by wading shorebirds is minimal. Also low population of bottom invertebrates indicates a low food value for many of the diving birds. Apparently, the shorebirds and waterfowl use the pond primarily as a rest area. The food values of this pond are probably far less important than its physical location. This relatively large body of quiet, stable water is protected from winds and high waves by Point San Pablo and by the pond's location behind the filled lands of the project. The area is isolated and is not subject to excessive human trespass or vandalism. This western most pond provides one of the few good ponded waterbird sanctuaries in the North Bay (Arend, 1974). There is no significant fishery in either of the dikes-off ponds (EAE, 1973).

2.37. The landfill section of the project site is a completely artificial setting (Plate 13) nevertheless, a significant habitat has been formed and a brief description is in order. Topsoil is constantly being pushed over the refuse as it is deposited at the edge of the fill. Behind the active dump the land is gradually stabilizing with vegetative growth, and various animals are filling the newly provided niches.

2.38. Along with the numerous rats (see paragraph 2.99) and house mice that are characteristic of a dump site, other animals inhabit the dry fill area (see Table 6). Voles, harvest mice, shrews, rabbits and hares find very suitable habitat among the tall grasses that cover most of the filled area. Many acres of mixed wheat and brome grasses grow wild. Along with these grain species common bay area invader grasses and forbs provide very favorable cover and forage for numerous pheasants and valley quail. Other birds found in large numbers include finches, sparrows, blackbirds, killdeer, crows and gulls. Although there is a disagreeable odor in this area, it does not seem to make the landfill any less desirable to wildlife, judging from the large numbers of species observed. Birds common to the area are shown in Table 4.

2.39. Physical evidence indicates that the existing Class I pond (Area IP, Plate 14) inflicts a low-level but consistent attrition to waterbirds, and occasionally entraps non-aquatic species (Arend, 1974).

Most of the losses appear to occur to coots and ruddy ducks. Coots migrate and fly at night, and at such time will be attracted to the water sheen on this small oiled pond. Ruddy ducks behave similarly. Mourning doves have been found in the pond where they probably settled for a drink of fresh water and become fouled with the scum oil at the edges of the pond. The pond is too small to entice large flights of pintails, wideons, and other ducks. Shorebirds are probably lost here in minor numbers, but because they are fragile and small-bodied evidence of this loss is lacking.

2.40. Fish and wildlife resources. The open waters, marshlands, mudflats, and transitional lands (area between actual wetlands and terrestrial uplands) of San Pablo Bay provide habitat for an abundant and diverse assemblage of fish and wildlife species. Of significant importance is its function as a resting and feeding area for the migratory birds of the Pacific Flyway; hence, it contributes to the welfare of migratory birdlife from the Arctic Circle to South America (BCDC, 1969). These birds are afforded protection under the Migratory Bird Treaty Act of 3 July 1918 (40 Stat. 755, 16 U.S.C. 703-711), as amended. The number of birds are lowest during summer months when resident and small migratory population are present. Peak populations are in the fall and winter when large numbers of migrants arrive. The same waters contributing to the welfare of these birds also provide habitat for nearly 100 species of fish (BCDC, 1969) and also serve as a migration route for many important anadromous fish species.

2.41. It is well-known that salt marshes and shallow water areas within an estuary provide habitat for numerous species of larval, young, and juvenile fish and shellfish. The portion of San Pablo Bay immediately north of the project area has been documented as being of value for numerous fish species (Wooster, 1971). On-going studies being conducted by the Fish and Wildlife Service (Reese, 1975) in the intertidal and subtidal areas of the project site substantiate the findings of Wooster (1971) and confirm the importance of these specific areas as feeding and nursery area for many of the forage and game fish species inhabiting San Pablo Bay. Sampling results indicate the predominance of young and juvenile fish such as striped bass, Pacific staghorn sculpin, shiner perch, starry flounder, surf smelt, topsmelt, and several species of shrimp in the shallow water areas. As of 13 September 1974, a total of 9,321 fish had been captured in the intertidal and subtidal areas of the project site. Of the total number of fish caught, approximately 75 percent have been young-of-the-year striped bass. Studies also indicate significant numbers of unidentified fish eggs and larvae in the area. A list of fish species found in the intertidal and subtidal areas of San Pablo Bay are included in Table 8.

2.42. Endangered and threatened species. The Endangered Species Act of 1973, Public Law 93-205, provides for the conservation of endangered and threatened species of fish, wildlife and plants. Three endangered

species that appear on both the Federal (FWS, 1974) and State (CSRA, 1974) endangered species lists are the California brown pelican, California clapper rail, and the salt-marsh harvest mouse. All three of these species are known to occur in the project area.

2.43. The California brown pelican occurs on the Pacific Coast from Canada to Mexico. A 1972 survey indicated that the total population approximates 100,000 birds with 20,000 pelicans frequenting California's Coast from August through November. Reproductive failure endangering this species is due to collapse of thinshelled eggs during incubation, attributed to the effects of pollutants on breeding birds (CSRA, 1974). Brown pelicans have been observed in the landfill area by U.S. Fish and Wildlife personnel (Reese, 1975).

2.44. The California clapper rail is highly specialized and apparently incapable of adapting to environmental change. Major populations occur in salt marshes bordering South San Francisco Bay, where they number 2,200 birds. Smaller populations exist in San Pablo Bay and Elhorn Slough (CSRA, 1974). Gould (1973) made multiple observations at the mouth of San Pablo Creek in 1973. Five birds were monitored by call and call response. Rails were not observed south of San Pablo Creek. Three California clapper rails were observed in the vicinity of the project site in 1969 (Bauer and Speth, 1974).

2.45. The salt marsh harvest mouse has the ability to sustain itself on a salt marsh drinking supply, a trait that is shared by only a few desert species of small mammals. The physiological and evolutionary value of this animal is therefore of extreme importance (Schaub, 1971). The habitat of the salt marsh harvest mouse consists of salt and brackish marshes. Because of the vast reduction of salt marshes around the Bay due to extensive diking and landfill measures, the salt marsh harvest mouse has been placed on the endangered species list. A survey conducted by the California Department of Fish and Game (Schaub, 1971) found the San Pablo Creek marshes to be a prime habitat with moderate populations of mice.

Geomorphological Setting.

2.46. Topography. A topographic survey of the project area was conducted by the San Francisco District in 1973. This survey is shown on Plate 15. The mean higher high water (MHHW) line is shown on this plate.

2.47. The Class I area layout and topography are shown on Plate 16. The site of the proposed Class I disposal area (Area IB) is the tidal range of San Pablo Bay. The area is bounded on the west by the sanitary landfill, on the north by an embankment along the effluent channel from the San Pablo Sanitary District treatment plant, and on the east by a perimeter roadway dike. Existing ground surface elevation range from 2 feet (Mean Sea Level = 0 Datum) within the area to 8 feet along the inclosing dikes.

2.48. The existing Class I disposal site (Area IP) is approximately nine acres in area. The surface elevation of the retained liquid wastes is approximately 4 feet MSL. Due to evaporation, the surface elevation of the ponded liquid wastes has remained essentially constant for a number of years. Possibly due to evaporation the area surrounding the liquid waste is blanketed with sludge and chemical residues. The ground surface of the area surrounding the pond ranges from Elevation 4 to 11 feet MSL. The area north of the pond has been filled with Group 2 wastes to Elevation 15 feet MSL.

2.49. The portion of the property which is located to the north of the diked and/or filled areas is presently inundated by water of San Pablo Bay. Available data indicate that the elevation of the ground surface along the property line ranges from Elevation -5 to 2 feet MSL. However, accurate topographic information is not available for this portion of the site.

2.50. Geology and soil. The sanitary landfill site is located on a very gently sloping valley floor in an area that is underlain by a considerable thickness of unconsolidated sediment. The entire site is underlain by tidal mud flats and marsh deposits.

2.51. The upper soil, which extends to considerable depths, is a practically impermeable, organic, soft, highly compressible silty clay with interbedded layer of peat, sand and shells. This soil is a recent marine deposit and is commonly referred to as soft Bay Mud. The Bay Mud is usually underlain by a sand unit which in turn overlies an older bay deposit which consists of a stiff clay. The depth of these clayey and sandy sediments beneath the site and the nature of the underlying bedrock are not exactly known. Bedrock is estimated to underlie the site at a depth of approximately 300 feet. On the basis of known geological relationships within the general area, it is assumed that the site is underlain by a complex assembly of Franciscan rocks which comprise the Berkeley Hills.

2.52. Subsurface soil and ground water conditions in the proposed and existing Class I disposal area were explored by drilling 96 borings (Cooper, Clark and Associates, December 1971, and Cooper, Clark and Associates, August 1972). The borings and probe locations are shown on Plate 16. The data obtained from these borings and probes, show subsurface conditions at the locations indicated and are not warranted to be representative of subsurface conditions at other locations.

2.53. The borings indicate that existing fills in the proposed and the existing Class I disposal areas consist mostly of refuse or chemical residue wastes with up to 1 1/2 feet of earth. These fills are underlain at elevations ranging from -2 1/2 to +2 feet (Mean Sea Level = 0 Datum) by a black to dark gray, very soft to medium stiff, organic silty clay, commonly called soft Bay Mud, containing varying amounts of sand lenses and peat deposits. The Bay Mud extended to depths of more than 25 feet below the existing grade, where most of these borings were terminated.

2.54. Borings which were drilled in the most southerly portion of the presently proposed Class I disposal area, encountered a 3- to 8-foot-thick layer of medium dense to dense silty sand at depths ranging from 9 to 18 feet below the existing grade or approximately 9 to 12 feet below the top of bay mud deposits. Sand lenses ranging in thickness from less than 1 inch to 1 1/2 feet were also encountered at shallow depths in the borings drilled in the proposed Class I disposal area. Probing made in the area where the silty sand was encountered met refusal at depths ranging from 4 feet to 17 feet below the existing ground surface.

2.55. Based on these borings and probings, subsurface sections in the proposed Class I disposal area and around the existing Class I disposal area were developed. These sections are presented on Plate 17A through 17J.

2.56. Hydrogeology. In order to determine the potential for seepage of pollutants from the land surface downward into usable groundwater supplies, a study (Nevin and Ellis, 1971) was made of pertinent geological and groundwater conditions and factors. Such analysis was necessarily made of conditions over a large area surrounding the landfill site to define the groundwater basin characteristics and the site's hydrogeologic position within the basin. Through interpretation and extrapolation of available data, groundwater conditions were defined and pollution possibilities appraised. Drillers water well logs, foundation boring logs, water level records, water quality data, and well performance records were collected from many sources, including commercial companies, public agencies, and private individuals. Inasmuch as well use has declined for many years in this area, much of the available data were old and records on many wells have been lost. Previous studies of San Francisco Bay sediments were also reviewed, but no comprehensive hydrogeologic studies have been made in this area.

2.57. The groundwater basin encompassing the landfill site occupies an area bounded on the north and east by the Hayward Fault, marked by the Berkeley Hills, and on the south and west by the San Pablo fault, which lies along the north edge of the Point San Pablo Peninsula. To the northwest, the basin merges with bay mud deposits and/or sediments from sources across the Bay. Consolidated bedrock underlies the basin sediments at depths averaging perhaps 300 feet.

2.58. The groundwater basin is made up of unconsolidated sediments of clay, sand, and gravel, which dip generally westward toward the Bay in this area. Clay predominates in the basin, making up as much as 90 percent or more of the alluvial section in most areas for which data are available. It occurs typically in large thicknesses and is virtually impermeable. Sand and gravel layers, deposited mainly by San Pablo and Wildcat Creeks, are sparse and highly variable in occurrence and cannot be individually traced for any distance. Generally only a few feet in thickness, they are found mostly below depths of 100 feet or more. Such deeper pervious beds constitute the only productive aquifers within the area.

2.59. Semi-consolidated and unconsolidated clay and mud underlie San Francisco Bay and extend beneath the entire landfill area to maximum depths of about 150 feet. Thin stringers of sand occur erratically within these materials, but are discontinuous over any distance and have no direct connection with sediments of the groundwater basin. General subsurface relations are depicted on a hydrogeologic cross-section in Plate 18.

2.60. The majority of aquifer material, which lies at greater depths, is overlain by thick and tight clay zones which serve as aquicludes to confine these aquifers under artesian pressure. This deep aquifer zone is encountered at depths of 80 or 100 feet several miles to the east of the landfill area, but deepens to below 180 feet in the project vicinity. This zone has not been fully penetrated by most wells and appears to vary greatly in makeup and thickness. Except when pulled down by localized heavy pumping, deep wells exhibit a water level (piezometric surface) much above that of the actual producing aquifers. This condition exists beneath all the lower lands in the West Richmond - San Pablo area and for an undetermined distance eastward. Other miscellaneous thin aquifers at shallower depths are also overlain by substantial thickness of impermeable clays and probably have their own individual pressure heads.

2.61. Very shallow sand and gravel beds carry meager quantities of water which are unconfined and water table conditions prevail. Most of these occurrences are perched by underlying clays; this is particularly the case for sand lenses within bay mud deposits.

2.62. Replenishment of basin groundwater is mainly from percolation of stream flows in high areas considerably east of the landfill site where aquifers are not capped by impermeable clays and can receive surface water seepage. From such recharge areas, groundwater moves as the ground slopes toward the Bay. In the general vicinity of the landfill, natural movement is westward but the groundwater gradient is close to flat, and rates of movement are probably insignificant. Subsurface outflow from the shallow zones in this area is probably blocked by bay mud deposits. The deep aquifer zone is also blocked, or extends beneath the bay mud; in either case there is no significant outflow at depth.

2.63. Depths to water tend to be quite shallow in the lower portions of the basin, except where pulled down by well pumping concentrations. Both the static water table and artesian, or piezometric heads, are within 5 to 10 feet of the ground surface west of the railroad tracks in the San Pablo Creek area. Somewhat deeper static well levels, about 25 to 30 feet below ground surface, have been reported upstream to the east in the vicinity of San Pablo Avenue and much lower levels have been experienced in various localized areas under the influence of heavy pumping by larger wells.

2.64. Water quality in the lower artesian zone is usable for most purposes, although somewhat hard. The best quality of water is obtained below depths of about 100 to 125 feet generally. In the locality of the landfill, the bay mud contains no usable water; other sediments within depths of 50 to 100 feet contain water which is brackish and unusable for most purposes.

2.65. Groundwater usage in the Richmond-San Pablo area was widespread many years ago prior to the availability of surface water. During that time, many commercial operations and residences had their own individual wells and the others were supplied from wells by water service companies. Most wells for these uses have long since been abandoned in favor of service from the East Bay Municipal Utility District. Substantial irrigation from wells was carried on to relatively recent times, being mainly concentrated in the area west of the Southern Pacific and Santa Fe Railroad tracks and north of the Standard Oil refinery. Practically all regular commercial irrigation has now ceased; current irrigation is restricted largely to specialized nursery operations in this general area, only a few of which use wells. Two wells on Richmond Sanitary Service property are presently used sparingly for maintenance purposes only. Thus, groundwater usage is very small in the general landfill area, as well as throughout the entire basin, and can be expected to reduce even further in the future. There are no known abandoned water wells in the landfill area.

2.66. Basin capacity and productivity are indicated to be limited by the scarcity of aquifer material noted earlier and also, by water level response to well use. The largest well yields have reportedly been in the 300 to 350 gallons-per-minute range, although the majority pumped less. Some deep wells have had tested maximum yields of less than 50 gpm. Water levels in both shallow and deep wells are generally quite shallow when not influenced by pumping. However, past pumping records on larger wells show drastic drawdowns in many cases and specific capacities are commonly only about 1 to 2 gallons per minute of yield per foot of drawdown.

2.67. In the lower land area west of the railroad tracks, as well as for some distance upstream to the east, wells for irrigation have had to rely for quantity on strata in the 200-foot depth range. Additionally, wells in the lowlands have depended on the deep zone to obtain potable supplies and poor quality shallow water has been sealed off. The best protection against contamination from these shallow waters has been attained by setting a larger casing to a depth of 100 feet or so, running the smaller diameter regular well casing to bottom with perforations only in the lower zone, and filling the annular space between the two casings with cement.

2.68. Hydrology. The northwesterly side of the disposal site is exposed to the tides, winds and waves of San Pablo Bay, while lower San Pablo Creek runs through the site and Wildcat Creek, after very closely paralleling San Pablo Creek through part of San Pablo and Richmond, empties to the Bay just south of the disposal site.

2.69. The flood flow magnitudes that reach the project area are limited by the capacities of the channels through the cities of San Pablo and Richmond. Flows in excess of these capacities flood into adjacent areas and, in effect are stored until the recession of stream-flow allows them to return to the channels. Overland flows paralleling the channels are largely prevented by raised roadbeds, particularly the Southern Pacific and Santa Fe railroads.

2.70. The San Francisco District, U.S. Army Corps of Engineers, conducted a study to determine the feasibility of providing flood control and related water resource improvements on Wildcat and San Pablo Creeks (Department of the Army, 1973). Analysis of existing channel conditions and review of historical flood data for Wildcat Creek and San Pablo Creek indicate that channel capacities are inadequate to pass floods of large magnitude. The estimated channel capacity of Wildcat Creek varies from 2,300 cubic feet per second (cfs) upstream from San Pablo Avenue to 400 cfs downstream from the Southern Pacific Transportation Company railroad bridge. On San Pablo Creek, the capacity varies from 5,000 cfs in the vicinity of San Pablo Avenue to 600 cfs near the mouth of the creek.

2.71. The two creek basins combine into a common flood plain (see Plate 6) which would inundate approximately 2,070 acres during standard project flood and would include approximately 1,860 acres during a 100-year storm event. A standard project flood is a large and improbable flood, usually simulated by placing the largest storm of record in a given region over a specific basin or sub-basin. The standard project flood estimated at 23rd Street and based on future conditions of urbanization for San Pablo Creek is 7,600 cfs, and for combined flow for San Pablo Creek and Wildcat is 9,500 cfs. The flow rate at the lower reaches

of the creeks would be somewhat less. Discharge frequency data representing present conditions were derived by correlation of the standard project flood and estimated historical events on San Pablo and Wildcat Creeks with the standard project flood and gauged discharges on Pinole Creek located in nearby basin. This data is presented below:

| Exceedence Frequency Years per 100 | Discharge in c.f.s. | | | | | |
|---------------------------------------|---------------------|-----------|-----------------|-----------|----------------|-----------|
| | Wildcat Creek | | San Pablo Creek | | Combined Flow | |
| | at 23rd Street | | at 23rd Street | | at 23rd Street | |
| | <u>1/</u> | <u>2/</u> | <u>1/</u> | <u>2/</u> | <u>1/</u> | <u>2/</u> |
| Standard Project Flood | 2,700 | 3,000 | 7,700 | 7,600 | 9,800 | 9,500 |
| 1 | 2,000 | 2,200 | 3,650 | 5,100 | 4,800 | 6,700 |
| 2 | 1,750 | 1,900 | 2,250 | 4,000 | 3,500 | 5,500 |
| 5 | 1,350 | 1,550 | 1,250 | 2,670 | 2,600 | 4,200 |
| 10 | 1,100 | 1,280 | 970 | 2,100 | 2,050 | 3,400 |
| 50 | 370 | 580 | 320 | 990 | 590 | 1,550 |

1/ Present conditions of urbanization.

2/ Future conditions of urbanization.

SOURCE: Department of Army, August 1973.

2.72. Extreme high tide at the landfill site is about 5.6 feet (MSL). The fetch, or travel distance of wind over water, can be up to about 11 miles with the wind in the right direction. The water is relatively shallow over parts of this distance, so there is a possibility of significant wind tides which could increase the maximum tide level to 7.0 feet (MSL) (Nevin and Ellis, 1971).

2.73. Seismicity. The San Francisco Bay Area is in an active seismic region and a number of great earthquakes have occurred during historical times. The San Andreas and the Hayward Faults are two of the historically active and great earthquake faults that traverse the Bay Area. Many other faults are also present within the Bay Area. Some of these may be permanently "locked" and considered dead, while others may be merely dormant. While it is presently impossible to predict where and/or when a major earthquake will occur, it must be assumed that such an earthquake will occur within the life span of any new structure or improvement constructed within the San Francisco Bay Area. Within the limits of present knowledge, the effects of these earthquakes can be minimized by avoiding areas of known special seismic hazard and by using the best engineering, geologic and construction techniques available.

2.74. The landfill site is located on a very gently sloping valley floor in an area that is underlain by a considerable thickness of unconsolidated sediments. The entire site is underlain by tidal mud flats and marsh deposits. The alluvial sediments at the site dip at

angles northward toward the bay. The bedrock formations to the northeast are separated from the alluvial valley and the site by the Hayward Fault. Likewise, the bedrock formations that underlie the San Pablo peninsula are separated from the site by the San Pedro-San Pablo Fault (see Plate 19).

2.75. The Hayward Fault is seismically active and is one of the greatest earthquake faults in northern California. This fault, which has been the cause of a number of destructive earthquakes within the Bay Area during the past 170 years, lies approximately 1 1/4 miles east of the site. The San Pedro-San Pablo Fault is not considered to be seismically active at this time (Cooper-Clard & Associates, December 1971).

2.76. There have been 19 earthquakes reported between 1936 and 1970 (Table 9) that could have caused damage or did cause damage in the Richmond area. Prior to about 1920, no reports were made of damage within the area. This lack of reports can be primarily attributed to the area's low population density during that period, however, it can be assumed that earthquakes that caused damage in the Berkeley area (e.g., 1868 Hayward earthquake) would have caused damage in the Richmond area. Although the record of earthquakes does not cover a period long enough to make meaningful estimates of recurrence intervals for damaging earthquakes, the frequency of damaging earthquakes in this area in the past is such that damaging earthquakes in the future should be expected (Bishop and Know, 1973). Tables 10 and 11 list all the earthquakes from January 1910 through March 1970 whose epicenters were in the Richmond area.

2.77. Tsunamis, often incorrectly called tidal waves, are long period waves, usually caused by underwater seismic disturbances, volcanic eruptions, or submerged landslides. Although no devastating tsunami has been recorded in the Bay Area, and the likelihood of one is small, the possibility still exists. In addition to tsunamis from distant sources, there is a possibility that local events could produce this phenomenon. However, large tsunamis appear to be the result of vertical displacements of the sea floor, and the tectonic movements expected from faulting in the Bay Area is mainly a horizontal direction. With the lack of data to the contrary, it can be assumed that waves generated from local events would not be any larger than those recorded from distant sources (Bishop and Knox, 1973).

2.78. Ritter and Dupre (1972) have concluded that a tsunami having a wave height or runup of 20 feet may arrive at the Golden Gate once every 200 years. Runup is defined as the rush of water up a structure on the breaking of a wave. The amount of runup is the vertical height above still water level that the rush of water reaches and is seldom much greater than the height of the wave as recorded close to shore.

Comparision of tsunamis at Fort Point and Richmond (Ritter and Dupre, 1972) show that the wave height at Richmond is about half that at Fort Point. In San Pablo Bay, east of Point San Pablo, the height of the waves would be diminished further. Other factors capable of causing exceptionally high tides are low barometric pressure, onshore wind, and abnormally high runoff from the Sacramento River. The probability of all these factors coming into play at the same time as the 200-year wave seems remote.

2.79. A seiche is a free or standing-wave oscillation that occurs in a confined body of water, such as a reservoir or lake. Earthquake-generated ground waves, which have a period that matches the natural period of the lake or reservoir, may cause the water to oscillate. The resulting runup can cause considerable damage to shoreline installations. Dams and reservoirs can be overtopped and large volumes of water released to inundate or flood downstream development. Similar but even more catastrophic inundation can result during earthquakes from a dam failure or from large masses of earth that might be broken loose and slide into a reservoir or bay.

2.80. The major risk of seiches with respect to the landfill would be that the earthquake movement of water within San Pablo Reservoir, located east of the landfill site upstream on San Pablo Creek, might burst the dam or overtop it. The height of San Pablo Dam is 170 feet. Elevation of the crest of the dam is 329 feet (MSL). The maximum water elevation is maintained at 315 feet allowing a 14-foot runup prior to overtopping. If the oscillation is oriented in the direction of the dam, overtopping could occur. The volume of water that might be discharged into San Pablo Creek probably would be relatively small, and flood damage would be confined to the area directly below the dam and close to San Pablo Creek. The water that might top Briones Dam, located further upstream on San Pablo Creek, would run into and be contained by San Pablo Reservoir. Because the long axis of the two reservoirs are oriented at right angles to each other, the possibility of both reservoirs overtopping from seiche activity in the same earthquake is remote (Bishop and Knox, 1973).

2.81. The East Bay Municipal Utilities District (EBMUD) has recently undertaken a detailed investigation of the dam to alleviate concerns and to form the basis for any needed corrective measures. As required by State legislation, the EBMUD has initiated the preparation of dam failure inundation maps for 32 of its reservoirs. Both of these studies are presently under preparation and have yet to be released.

Social and Economic Considerations.

2.82. Service area. The site provides a disposal area for a number of North Bay cities and districts. Primary communities served by the Richmond Sanitary Service are Richmond, San Pablo, El Sobrante, Pinole, and Hercules in Contra Costa County.

The Bay View Refuse Service serving Kensington and the East Bay Sanitary Service serving El Cerrito in Contra Costa County deposits at the site. The Bay City Refuse Company serving Sausalito, Marin City and some government contracts in Marin County utilized the site. The Mill Valley Garbage Company serving Corte Madera, Tiburon, Belvedere and part of Mill Valley in Marin County dumps at the site (Halsey, 1974). On 13 January 1975 the Richmond City Council authorized the Richmond Sanitary Service to discuss and negotiate with other disposal companies to deposit materials on the project site. Any new contract with other companies would come before the Council for approval.

2.83. Population trends. An important aspect in the determination of long-term refuse disposal needs for any area is the forecasting of population for that area. The Contra Costa County Planning Department prepared population projections in June 1974 for the western section of the County as shown on Table 12. The western section (as shown on Plate 22) is an established area in which growth will occur mainly as a result of in-filling; consequently projections do not reach the levels nominally possible in the other sections of the County. Four private companies collect refuse in this western area. Two companies, East Bay Sanitary Service and Richmond Sanitary Service, utilize the West Contra Costa Sanitary Landfill Project (see paragraph 2.82). The Crockett Garbage Company presently utilizes the Vallejo Dump in Solano County, and the Rodeo Garbage Service utilizes the Acme Fill Dump east of Martinez. As seen from Plate 22, the areas served by the Crockett Garbage Company and the Rodeo Garbage Service represent only a small portion of the population in the western area of Contra Costa County. The population projection used in the analysis of the holding capacity of the landfill project (paragraph 2.94) used earlier estimates (January 1973). As shown on Table 12, these earlier projections are somewhat higher than more recent estimates.

2.84. The population of the area of Marin County contributing to the West Contra Costa Sanitary Landfill (see paragraph 2.82) was estimated at 56,865 in 1970 and is forecasted to be 78,744 in 1990 (Garretson, 1974).

2.85. North Richmond. The community of North Richmond, by virtue of its proximity to the landfill site, is directly impacted by the landfill operation. The origin of present day North Richmond dates back to World War II when shipbuilding activity in Richmond sparked the influx of over 12,000 southern Blacks. The only places for the newcomers to live were in the war housing projects or in North Richmond, which was then an agricultural area. During the early 1950's, the temporary wartime housing was demolished causing another influx into North Richmond. In 1955 the Hensley Industrial Tract was created resulting in an industrial barrier between Richmond and North Richmond. Proposed annexation to Richmond of the County portions of North Richmond was defeated in 1953 and again in 1965. In 1968, North Richmond was designated part of

Richmond's Model Neighborhood area (see paragraph 3.18) Increased Federal assistance became available to pool with local funds to upgrade recreational and community facilities and improve delivery of social health services.

2.86. Between 1960 and 1966, when a special population count was sponsored by Richmond for the entire North Richmond area, the population of North Richmond declined, reversing the growth trend of the 1940's and 1950's. There has been a small decrease in North Richmond since 1966. The 1970 census shows 4,400 people, 94 percent of them black (Contra Costa Planning Department, 1971).

2.87. Most North Richmond residents who are employed, work at low status jobs, such as domestics, seasonal cannery workers or laborers. In 1965, over half of the employed residents were unskilled. While some 58 industries in the area employ 3,200 employees, only a handful of community residents are employed by these industries. In 1970, the County Department of Social Services reported that nearly 45 percent of the North Richmond population was receiving public assistance.

2.88. Area recreation needs. Recreational opportunities are important in socially depressed areas to provide an outlet for the local people. Recreation facilities are relatively sparse in the Richmond - San Pablo area and additional facilities for outside recreation will be needed in the future.

2.89. Need for solid waste disposal site. Solid waste disposal is a problem for all communities. In the San Francisco Bay Region, projections of population growth and solid-waste production from 1967 to 2000 indicate that while population growth will double, solid waste production will increase by almost two and half times (Goss, 1972). The State Solid Waste Management Board is currently reviewing refuse generation rates and population growth projections. Better data on projected solid waste loadings will be developed through their local solid waste management plan (Marino, 1974). In the San Francisco Bay Region, there are presently four Class I sites, the West Contra Costa Sanitary Landfill site being the only Class I general proposed solid waste disposal site. The site accepts a present annual volume of about one million gallons of Group I liquid waste.

2.90. Solid waste generation. Per capita solid waste production is increasing annually nationwide. The SSWMB (see paragraph 1.10) is currently reviewing refuse generation rates and population growth projections. Table 13 presents generation factors developed by the SSWMB for a variety of solid wastes including residential and commercial refuse, and demolition and construction waste.

2.91. Densities commonly experienced during the processes of storage, collection, transfer, and landfill disposal are listed in Table 14. These factors reflect average solid waste generation rates in California and are not presented as absolutes. When used in conjunction with accurate complimentary data such as population and agricultural statistics, these waste generation factors can be used to estimate the numbers and capacity storage, collection and transfer equipment and facilities needed for adequate solid waste services, as well as potential needs for resource recovery and disposal sites.

2.92. On 1 January 1974, the RWQCB established a self-monitoring program for the West Contra Costa Sanitary Landfill Project. Data based on measurements obtained as a part of this program established the fact that currently there is being deposited at the site approximately 260,000 cubic yards of solid waste per year.

2.93. Effective 1 May 1974, the Richmond Sanitary Service entered into a written agreement with the West Coast Salvage Company an affiliate of Golden Gate Disposal, San Francisco, California, granting the West Coast Salvage Company the exclusive license and privilege to salvage any and all refuse, garbage and waste material of any kind from the sanitary landfill site. The consequence of the work performed by the West Coast Salvage Company will be to reduce the net volume of residual solid waste at the site, thus increasing the capacity of the dump and its projected life.

2.94. An analysis of both the holding capacity of the presently used 350 acre site, and the refuse to be generated by the area serviced by the site beyond the year 2020 was conducted by the firm of Kister, Savio and Rei of El Cerrito, California (see Document A-8, Appendix A). Based upon this analysis, the Richmond Sanitary Service estimates that the useful life of the dump will continue for an additional 50 years; the gross amount of fill deposited at the dump during this 50 year period would be approximately 13 million cubic yards; and the anticipated increase in volume brought about as a result of population growth will be offset by the reduction in new volume resulting from the salvaging, reclamation and removal from the site through the recycling program mentioned above (Murdock, 9 August 1974).

2.95. Hazardous waste generation. The volume of non-radioactive industrial wastes produced in California exceeds 3.5 million tons each year. It is estimated that between 35-60 percent of these wastes may be hazardous (Collins and Storm, undated). A hazardous waste is defined in Chapter 6.5, Division 20 of the California Health and Safety Code as "Any material, for which no use or reuse is intended and which is to be discarded, which is toxic, corrosive, flammable, and irritant, a strong sensitizer, or generates pressure through composition, heat, or other means, if such waste or mixture of wastes may cause substantial personal injury, serious illness, or harm to wildlife, during or a proximate result of, any disposal of such waste or mixture of wastes." The bulk

of these wastes is produced and disposed of in the San Francisco Bay Area and the Los Angeles Area. Assuming an increase of 10 percent per year and current generation rate of 1.5 million tons per year of hazardous wastes, the yearly production in California would increase by approximately 3 million tons by 1980 and by over 20 million tons by 2000 (Collins and Storm, undated). Presently, there are 13 Class I disposal sites operating in California, serving about 30 percent of the industrial waste generated in the state. In the San Francisco Bay Region, there are only four Class I sites at present, the West Contra Costa Sanitary Landfill site being the only Class I general purpose solid waste disposal site (Goss, 1972).

2.96. During the three month period, July through September 1974, the West Contra Costa Sanitary Landfill Project received 3 million gallons of chemicals which were deposited in the liquid waste pond and 7,422 drums or barrels (55 gallons) which were deposited in the barrel storage area (Murdock, 19 November 1974).

2.97. Public health and well-being. Mismanagement of hazardous wastes can result in serious hazards to the public health and to the environment. Such mismanagement practices include mislabeling hazardous waste, and unsafe handling and disposal practices. As a result of such practices, the potential does exist for the short term injury of workers and the public through fires (see paragraph 2.112), explosions and other violent interactions and discharge of corrosive and toxic substances from hazardous wastes. On the long term, improper disposal methods can result in eventual ground water contamination by toxic wastes, explosions and fires from long buried wastes, and chronic poisoning of persons, flora, and fauna by repeated contact with low levels of air borne or water borne wastes.

2.98. Limited ground water resources underlie the disposal site (see paragraph 2.57). Existing conditions, i.e., an extensive thickness of low-permeability sediments including bay mud, and confinement of ground water with an upward direction of flow, preclude waste migration to usable ground water.

2.99. The Rodent and Vector Control Unit of the Contra Costa County Health Department, conducted trapping activities for rats at the landfill site on four occasions during 1974. These activities were conducted as part of the Health Department's surveillance program in rat control. The capture rate found at the site ranged between 6.7 percent and 10 percent. A capture rate of 20 percent or greater is indicative of severe rat infestation. (McGurk, November 1974).

2.100. There is a rat problem in North Richmond, however, this is most likely to be associated with improper garbage storage rather than with the sanitary landfill. The distance of 1.2 air miles to the edge of residential North Richmond precludes the influence of the site as an immediate source of rats, since the normal home range of the Norway rat (local species) is within 150 to 200 feet from the food source (McGurk, October, 1974).

2.101. The thousands of gulls that frequent the active dumping areas could pose problems. In his studies between 1968 and 1972, Dr. Howard Cogswell of the University of California at Hayward estimated that from 8,000 to 15,000 gulls frequent the site (Cogswell, 1973). He found that these gulls present an aircraft collision hazard, which can be classified as medium-low, to aircraft approaching Hamilton Air Force Base in Marin County. The final approach pattern crosses the site at approximately 2,000 to 3,000 feet. Although gulls tend to remain closer to the ground, they will frequently soar to these heights, particularly when active thermals are present. Informal contact with the Hamilton Air Force Base Safety Officer (Gottlieb, 1973) indicates that Air Force aircraft have experienced no such collisions while approaching the base.

2.102. Although the gulls migrate daily between the site and San Pablo reservoir to the east, studies have found no cases of human diseases traceable to gulls. Other studies have shown negative results of gulls being vectors for avian diseases (CDEG, November 1973).

2.103. The vegetation in the marshes provides a sink for air pollution (see paragraph 2.126). In a similar manner the open water of the Bay provides a ready source of oxygen (see paragraph 2.27).

2.104 Visual Setting. Any single view of the roughly circular San Pablo Bay, ten to twelve miles across, includes a variety of motion and color. Due to its dimensions, typical views from high or low angles include a vast sky and often strong sun reflections near the horizon. The size of the Bay subdue the prominence of industrial facilities on its southern edge.

2.105. Richmond's shoreline is the City's major physical feature. Currently, it is largely unkempt and uninviting because of localized dumping, misuse of the natural terrain, and underutilization. The area surrounding the landfill site is primarily low lying marsh, and tide lands, as well as San Pablo Bay. The site itself, is not readily visible from the access road, however, it does dominate the view and presents an unappealing site from the adjacent low areas.

2.106. Climate. The climate along the central California coast in the vicinity of San Francisco Bay is characterized by mild temperatures throughout the year, with small diurnal and annual ranges near the ocean and larger ranges further inland. Rainfall is concentrated in the period of November through April when about 90 percent of the annual total amounts occurs. Winds are generally onshore, from the west through north and are modified locally by terrain features. Severe weather is rare, usually occurring in the winter months in conjunction with frontal passage when high winds and heavy precipitation may occur. Climate mean data for Richmond are presented in Table 15.

2.107. The concentration of air pollution present in a given area is basically a function of the quantity of pollutants emitted into the atmosphere and the volume of air that is available for dilution and dispersion. The height of the inversion base limits the volume of air available for dilution and dispersion of pollutants, and causes wind-flows to be channeled more than usual by terrain. The height of the inversion base varies diurnally as well as annually.

2.108. Generally, in the San Francisco Bay Area an inversion height of at least 2,500 feet is needed to remove restrictions to airflow circulation as a result of terrain features. During the period 1957-1967 inversions measured at Oakland at or below 2,500 feet persisted on 90 percent of the afternoons in the months of July and August, and more than one-half the time in the two months immediately preceeding and following July and August. Critical level inversions (2,500 feet) were less common between November and April, primarily as a result of unstable atmospheric conditions accompanying the frequent occurrence of frontal storm systems common during this period (James A. Roberts Associates, Inc., 1974).

2.109. Air Quality. BAAPCD maintains daily records of the various air pollutants for the Bay Area. An analysis of data from 1969 through 1973 (BAAPCD, 1974a) shows an improvement in all parameters in the Bay Area. Data collected in the first seven months of 1974 (BAAPCD, 1974b) indicate a continuation of this trend. The air monitoring station at Richmond indicates that Richmond has paralleled this improvement, and in part has shown less severe air pollution problems than the rest of the Bay Area. Appendix E summarized this air quality data.

2.110. Air pollution directly attributable to the past and ongoing refuse disposal operations comes from the following main sources:

- a. The compacting and earth moving equipment at the site;
- b. The vehicles transporting waste to the landfill site;
- c. The particulate matter suspended in the air during dumping, moving, compacting and covering of wastes, as well as those resuspended in the air by the prevailing wind;
- d. Landfill fires;
- e. Reactive organic gases resulting from Group 1 material deposited in the Class I disposal pond; and
- f. Miscellaneous odors and gaseous emissions.

2.111. The compacting and earth moving equipment at the landfill site (see Table 16) emit by-products of internal combustion and diesel engines. The vehicular transportation of waste materials to the site results in higher level of motor vehicle exhaust gases, higher levels of rubber dust caused by tire wear, higher levels of localized particulate, and odors. The particulate increase is due to engine emissions, dust blowing off of loads of waste being transported, and the grinding action of vehicle wheels passing over dirt and mud which fall from the wheels and under-carriage of various vehicles passing through North Richmond area. As this surface dirt becomes pulverized, the air turbulence caused by the passage of the vehicle lifts the lighter material into the air causing localized air/dust problems. Many of the cargoes of Group 1 and Group 2 waste have disagreeable odors. As the trucks and tankers carrying this material pass through the community, they often leave a malodorous wake.

2.112. A review of BAAPCD files and files of the San Pablo Fire Protection District show that there have been 56 known fires at the landfill site between 1961 and 1973 (see Table 17) (Donovan, 1974). Seventeen of the fires have taken place since October 1972. Three of the fires are known to have occurred at the Class I waste disposal site. The bulk of the fires took place in the general debris area where the public dumps, at areas where the garbage trucks unload, and where sewage and sludge are deposited. The landfill operators maintain water tankers and have earth moving equipment available for fire fighting. Fires are frequently extinguished within 30 to 45 minutes from the time they are detected, however, some of the fires have lasted hours and a few for two to three days.

2.113. The landfill operators receive and dispose of various Group 1 wastes at the site. The bulk liquid waste, which arrives by tank trucks or in other large containers, is placed in the Class I disposal pond. The chemical waste that arrives in drums is deposited in an area adjacent to the pond. The drums are presently covered with a layer of dirt at the end of each working day. The covering is accomplished with a bulldozer. Chemicals stored in bottles and vials inside the drums are allowed to mix with each other when the drums are dumped or ruptured. In the approximate 50 year history of the operation of the landfill there have been less than 10 occasions when drums have ruptured and/or exploded causing fires and general fumigation of the area; this has occurred twice in the last five years. One of these, in 1973, prompted criminal action (see paragraph 1.27).

2.114. The BAAPCD Regulation 3 exercises direct control on the emission of certain kinds of organic gases. These organic gases are those described as "reactive," that is, relatively quick in reacting with nitrogen dioxide in the atmosphere to form oxidants. The reactive organics are defined as olefins, substituted aromatics and aldehydes, which are categories of organic compounds. A large quantity of those reactive organics which arrive at the landfill site are deposited in

the Class I disposal pond. Prior to July 1973, the landfill operators did not identify the chemical waste entering the dump by specific compound or chemical family. Since that time, a liquid handlers' form has been prepared for each load of liquid waste brought into the disposal site, detailing the content of each load. The Richmond Sanitary Service has kept a completed copy of this form (see inclosure to Appendix B) as a part of its permanent records.

2.115. Table 18 is a compilation of some of the more common reactive organic compounds that are used by industry in the Bay Area and which could be disposed of at the landfill site on a daily basis. Most of the compounds are used as solvents or intermediates in chemical processes and arrive at the site in an impure state. Some of the compounds are considered as questionable in terms of high reactivity, but are included since they undoubtedly play a part in the formation of photo-chemical oxidant.

2.116. Mr. Raymond Hawksley, a Registered Professional Engineer of Richmond, California, has been employed by the Richmond Sanitary Service to undertake a study relating to the liquid waste pond. In an effort to determine the types of liquid wastes placed in the disposal pond a review (Murdock, 16 August 1974) was conducted by Mr. Hawksley of the liquid waste hauler's forms for the period April 1973 to February 1974. In a further effort to specifically identify the types of liquid wastes received at the site, and placed in the pond, all customers depositing such liquid waste at the dump site were requested to provide information concerning these wastes. Approximately 60 percent of the customers contacted responded to the request, representing well over 60 percent of the liquid wastes brought to the site on a regular basis. These responses are presently under review by the BAAPCD.

2.117. Regulation 3 excludes those operations that emit less than 20 pounds per day of total organics or less than 10 pounds per day of reactive organic gases. When the entire organic gas emission for the landfill is taken into account, including methane generated in the garbage disposal area (see paragraph 124), the organic gas emission rate most certainly exceeds 20 pounds per day (Donovan, 1974). Therefore, the operation is limited to an emission rate of not more than 10 pounds per day of reactive organic gases. This emission rate would be exceeded by the uncontrolled disposal of only a few gallons of reactive organic compounds per day. The present method and practices of liquid organic waste disposal employed at the landfill site are considered by the BAAPCD to be uncontrolled.

2.118. In an effort to arrive at an accurate as possible estimate of the reactive and non-reactive organic gas emissions originating at the landfill site and which are attributable to the disposal of liquid wastes, samples from the liquid waste pond were obtained. Samples were taken at 18 different locations at various levels throughout the pond. Because of the complexity of the material sampled and the great time and expense and unreliability of the projected results, it was not considered (Murdock, 16 August 1974) feasible to segregate and identify each individual component of the samples. Preliminary tests revealed the material to be made up of mixed petroleum wastes with the following properties:

| | | |
|------------------|---|-------|
| Flash point | - | 240°F |
| API gravity | - | 21.2 |
| Specific gravity | - | .9267 |
| Water content | - | 20% |

2.119. The aforementioned responses on the nature of the liquid waste material indicate that only small amounts of reactive wastes are delivered to the site and that in most cases such wastes are in barrels or their containers and are buried rather than placed in the liquid waste pond.

2.120. A series of readings were taken with a J. W. Model CSSP Brenton Equipment Company Combustible Gas Detector at various locations over the pond and at the perimeter of the Richmond Sanitary Service property. The results of these tests reveal that in most cases the readings at the pond surface are either the same or less than the readings at the two-foot and eight-foot levels over the pond; and that in most cases the readings taken in the circumambient air at the perimeter of the plant property upwind from the pond show higher values than those taken over the pond itself. These readings lead to the conclusion that no significant amounts of reactive organic gas emissions detectable by the equipment used are being emitted from the liquid waste pond (Murdock, 16 August 1974). If such were the case, the surface reading on the pond would exceed the circumambient readings above and upwind from the pond.

2.121. The BAAPCD has received ten complaints of odor from the landfill operation since 1961. Four of the complaints were the result of improper disposal of cannery waste which was deposited on the face of the fill and left uncovered. This occurred twice, once in 1964 and once in 1965. Since that time, there have been no complaints traceable to the Class II disposal area.

2.122. The remainder of the odor complaints (6) were attributable to the Class I disposal operations. The complaints were all received within a short time after malodorous waste was deposited in the waste pond or onto the face of the garbage fill. The BAAPCD is not aware of Class I type waste being deposited in the Class II area since 1966 (Donovan, 1974).

2.123. There are always disagreeable odors present on the disposal site. The BAAPCD has received a number of complaints of odor from residents of the North Richmond area, but these were attributed to other sources or were listed as unknown sources due to inadequate or late reportage. Given the proper atmospheric conditions (heat, low speed wind, and so on), the potential for odors to enter nearby residential area is present. BAAPCD records do not indicate the presence of a community-oriented odor problem from the landfill site at present.

2.124. Gas is produced naturally when solid wastes decompose. The quantity generated in a landfill and its composition depend on the types of solid waste that are decomposing. A waste with a large fraction of easily degradable organic material will produce more gas than one that consists largely of demolition debris and inerts such as glass, ash, metals, etc. The rate of gas production is governed solely by the level at which microbial decomposition is occurring in the waste. Microbial decomposition is affected by variables including moisture content, compaction of the waste, and the presence or absence of nitrogen nutrients. When decomposition ends, gas production ends. Methane and carbon dioxide are the major constituents of landfill off-gases. At first, carbon dioxide prevails but as synthesis changes from aerobic to anaerobic methane production increases 10 to 15 fold. Other gases may be present in lesser amounts and some may have a repugnant odor. Hydrogen sulfide may be generated, especially if there is as large amount of waste present containing a sulfur radical (i.e., sheetrock or wallboard - which is principally calcium sulfate). All decomposable waste containing sulfur, including liquid waste, are contributors, to hydrogen sulfide generation if not disposed of properly.

2.125. Little attention has been paid to the possibility of the generation of other gases at landfills up to now. Most studies have been concerned with the off-gases mentioned above. It is theorized that the presence of other gases is almost certain. BAAPCD, Regulation 2, contains specific limitations on five odorous compounds. These include trimethylamine, phenols, mercaptans, ammonia and dimethylsulfide. All of these substances are those characteristic of the petro-chem industries, many of which are steady customers of Richmond Sanitary Service. The indiscriminate dumping of these materials in the Class I areas will undoubtedly result in emissions exceeding those allowed by Regulation 2.

2.126. Both soil and vegetation have been found to be important "sinks" (absorption media) for a variety of air pollutants. It has been recently demonstrated that a variety of soil fungi effectively take up carbon monoxide from the atmosphere and indications in current research are that continuous exposure of soil to carbon monoxide induces even greater capacity for absorption (Inman, Ingersoll, and Levy, 1971; Inman and Ingersoll, 1971). It has also been demonstrated that soil bacteria consume hydrocarbons such as ethylene and that soil also effectively

removes sulfur dioxide and nitrogen dioxide from the air (Abeles, Craker, Forrence, and Leather, 1971). Heavy metals and other pollutant aerosols are absorbed by soils and are rapidly rendered unavailable to plants (Bohn, 1972). Aside from net oxygen production, vegetation has also been demonstrated to effectively remove pollutants such as hydrogen fluoride, sulfur dioxide, chlorine, nitrogen dioxide, ozone, and peroxyacetyl nitrate, a photo-chemical product (Hill, 1971). In light of current research on the importance of both soil and vegetation as "sinks" for air pollutants, open land (such as that remaining in the project site) close to heavily populated areas assumes an important consideration in the maintenance of air quality.

2.127. Noise. Noise generated at the landfill site falls into two categories. First, that resulting from the site operation, and second, that resulting from material transportation to the site. Noise at the site is caused by unloading, compacting, and earth movement operations. Equipment generally in use at the site are listed in Table 16.

2.128. Heavy duty trucks and transfer trucks contribute to the general noise level along their routes to the landfill site through the North Richmond area. A search of both the Contra Costa County and Richmond Public Health Department files for the past four years shows no noise complaints received on the Richmond Sanitary Service (Shahid, 1974).

2.129. Historic and Archaeological Features. In compliance with Section 106 of the National Historic Preservation Act of 1966 (16 USC 470 (f)) the most recent listing of the National Register of Historic Places (Federal Register, 19 February 1974 with monthly supplements) has been consulted and determination has been made that no National Register property is affected by the project. In compliance with Executive Order 11593 of 13 May 1971, the State Historic Preservation Officer was contacted and his determination is that there are no State Historical Landmarks or State Points of Historical Interest, which would be affected by the project.

2.130. Several archaeological sites are recorded as extant in areas adjacent to the landfill site. One large unexcavated Indian shell midden is located approximately 3/4 mile to the southeast of the site. Another shell midden is located approximately one mile to the southwest of the project area. An on-site survey (see Document F-4, Appendix F) in January 1974 revealed no surface evidences to indicate the presence of archaeological or historical sites within the project boundaries. However, the closeness of the above two sites indicates that the potential is high for subsurface archaeological resources to be present in the project area. Correspondence relating to historic and archaeological features of the project can be found in Appendix F.

2.131. Vehicular Circulation. Through traffic in the North Richmond area consists primarily of employees enroute to or from work in nearby industries, plus truck traffic to the same industries. These industries comprise not only manufacturing plants and warehousing operations, but also the sanitary landfill operation which also attracts heavy flows of private cars, trucks and trailers hauling waste material to the site. For the three month period from 1 July through 30 September 1973, 19,830 tons of material were hauled by garbage trucks, and 4,018 tons were hauled by the general public. Three million gallons of chemicals were deposited at the liquid waste pond and 7,422 drums or barrels (55 gallon type) were deposited in the barrel storage area.

2.132. The Richmond Sanitary Service operates 42 two axle trucks and 23 three axle trucks. Of these, 35 make two trips per day and 20 used for hauling garbage and debris make ten trips per day for a total of 270 trips per day. The Mill Valley Garbage Service operates 14 two axle trucks and 6 three axle trucks making a total of 20 trips per day. The Sausalito Garbage Service operates 4 two axle trucks and 3 three axle trucks making a total of 7 trips per day. The East Bay Sanitary Service operates 7 two axle trucks and 7 three axle trucks making a total of 14 trips per day (Murdock, November 1974).

2.133. Throughout the day individuals with private passenger automobiles and possibly pick-up trucks visit the site for the purpose of depositing garbage and rubbish. No precise record has been maintained of how many of these various types of automobiles are using the site. Neither are records kept of the number and type of trucks used in hauling liquid wastes.

3.00. RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS

3.01. Association of Bay Area Governments (ABAG). ABAG is a voluntary council of local governments formed to meet regional problems by cooperative action by cities and counties. All 92 cities and 9 counties in the San Francisco Bay Area can be voting members. Currently 84 cities and 7 counties (including the City of Richmond and Contra County) are members. ABAG works toward solution of regional problems and it is the area wide comprehensive planning agency for the Bay region.

3.02. ABAG's Regional Plan 1970:1990 for the San Francisco Bay Region was approved by the Association's General Assembly on 30 July 1970. Unlike the general plans adopted by cities and counties, this Regional Plan will not be used as the basis for any detailed application of the policy power on a parcel-by-parcel basis, as in the making of zoning or subdivision regulation. Rather the Plan provides regional policy guidelines to encourage actions by appropriate agencies that will initiate, direct, and promote regional growth and development as well as conservation of the environment; to clarify at all levels the decision making process related to area wide problems and issues; and to continue the development of the Regional Planning Framework as a guide to regional planning in the future (ABAG, 1970).

3.03. The Regional Plan designates the land fill site and adjacent marshland as "permanent open space". A permanent regional open space is considered a key factor in a unified urbanization and conservation policy. This policy advocates that both private and public open lands, as well as water areas and large and small waterways, be seen, used, and permanently protected for their positive open value in the region's urban and natural environments.

3.04. San Francisco Bay Conservation and Development Commission (BCDC). The BCDC was created by the McAteer-Petris Act in 1965. The Commission consists of 27 members representing Federal (2) and State (5) agencies, Bay Area Counties (9), cities (4), and the public (7). The Commission was created as a limited regional governmental agency specifically authorized and directed to carry-out the Bay Plan, empowered to raise sufficient funds for this purpose, and has the right to acquire Bay or shoreline land through negotiated purchase or through eminent domain, if necessary.

3.05. The San Francisco Bay Plan has been in effect since 20 September 1968, the date of its approval by BCDC. The Plan was adopted into law on 7 August 1969, when the Governor signed the McAteer-Petris Act. Operating under the McAteer-Petris Act and the Bay Plan, BCDC has been generally regarded as an example of a successful regional planning agency with adequate regulatory powers. The objectives of the Bay Plan are to protect the Bay as a great natural resource for the benefit of present and future generations and to develop the Bay and its shoreline to their highest potential with a minimum of Bay filling (BCDC, 1969).

3.06. The Bay Plan designates the landfill site and adjacent marshes as "water-front park/beach". The Plan further indicates that public access to the Bay for recreation is needed in the area, although existing shoreline conditions make this difficult. All development in the area should include provisions for substantial public access.

3.07. Contra Costa County. The Combined Open Space and Conservation Element of the Contra Costa County General Plan was adopted by the Contra Costa County Board of Supervisors on 18 August 1973. State law now requires plans to be implemented, through zoning and other regulatory measures. Plans can no longer be presented as flexible guidelines to be followed or ignored according to the expediency of the moment. The law specifies that an adopted plan represents official public policy which must shape development approval and other governmental actions.

3.08. The goal of the Contra Costa County Open Space - Conservation Plan is to obtain a system of permanent open space of sufficient size and locational qualities to provide a reserve for the protection of water and other natural resources, to preserve appropriate areas for agricultural production, to guide and enhance urban development, to prevent building in undesirable locations, to preserve natural habitats, and to preserve prominent natural landscape features (Contra Costa County Planning Department, 1973).

3.09. The County Plan designates the landfill site and adjacent marshland as "major open space area". The Plan considers urban open space as an important part of any urban community. Open space needs should be an integral part of community level planning and the design of properties.

3.10. In September 1973, the Board of Supervisors adopted a Refuse Disposal Plan as part of the Utilities Element of the General Plan. California Senate Bill No. 5 the "Nejedly - Z'berg - Dills Solid Waste Management and Resources Recovery act of 1972", prepared during the 1971-1972 session of the California Legislature, provides that each County prepare a comprehensive, coordinated solid waste management plan by 1 January 1976. The present County Plan is intended to serve as a guide in any further planning conducted in accordance with the provisions of S.B.5.

3.11. The goals of the Plan are to insure that citizens of Contra Costa County are afforded adequate refuse disposal for the protection of their health and safety and furtherance of their general welfare; to assure the development of refuse processing facilities which will satisfy the highest possible environmental standards or requirements; and to encourage the maximum utilization of the County's refuse resource by reclamation and recycling of that resource (Contra Costa County, 1973).

3.12. The Plan recognizes the role of the West Contra Costa Dump as a disposal site for the Western County region (see paragraph 2.83). In addition, the Plan specifically includes the development of programs to encourage refuse reclamation in existing landfill operations.

3.13. City of Richmond. The Richmond Coastline Plan (1973) was adopted by the City Council and added to the Richmond General Plan on 12 March 1973.

3.14. The objectives of the Plan are to provide more public access to the Richmond shoreline; to protect and enhance the marshes and tidelands as wildlife habitat areas, within the limits of feasibility; to develop coastline segments in a manner that will generate jobs for people living in Richmond; to coordinate the development of coastline areas with the overall development of Richmond, in a way that will improve the public image of Richmond and make it a more desirable place to live and work; and to attain a proper balance among uses of the coastline.

3.15. The Plan designates the landfill site as an "interim sanitary landfill" and as a "proposed future non-intensive recreational area."

3.16. Marshes within the City of Richmond, including the Wildcat and San Pablo Creek Marshes, are the remains of a more extensive group of marshes that thrived in Richmond before 1850 (see Paragraph 2.15). Marshes were for many years viewed primarily as barriers to developments and most were filled. As a remnant of this attitude, the remaining marshes in Richmond are presently zoned for light and heavy industrial uses.

3.17. The City of Richmond in recognizing the value of the marshes, designated them as preservation areas in the Coastline Plan and recommended discouraging further development on the marshes. The City Planning Commission is presently considering approval of a Special Features Additive District to achieve conformity between the General Plan (Coastline Plan) and the Zoning Ordinance. This conformance is required by State law.

3.18. North Richmond. The objectives of the Richmond Model Cities Program is to build the physical basis for change in the neighborhood, to strengthen the ability of local community organization and residents to carry out programs, to effect institutional changes in local agencies, and to find effective ways to capitalize on Model Neighborhood area assets and maximize economic development.

3.19. The Contra Costa County Board of Supervisors adopted the North Richmond San Pablo Bay Study (Contra Costa County Planning Department, 1971) in principle and referred the report for processing as part of the County General Plan on 7 December 1971. On 24 October 1972 the North Richmond-San Pablo Bay General Plan was adopted as an amendment to the General Plan of Contra Costa County.

3.20. The proposed development plan for the North Richmond-San Pablo area designates the landfill site as "shoreline recreational." The adjacent marshland is designated as "marshland preserve" and "wildlife preserve."

3.21. East Bay Regional Park District (EBRPD). The EBRPD is a limited purpose governmental agency operating under the California Public Resources Code. It is a tax-supported regional agency operating in Alameda and Contra Costa Counties, governed by an elected Board of Directors, providing regional parklands, and providing park, recreation and open space areas, trails, natural preserves and services for District residents.

3.22. On 4 December 1973 the District adopted its Master Plan. One of the District's primary goals shall be to create a balanced system of existing and new regional parklands by 1985 designated to reflect the needs and desires of residents of the entire District (EBRPD, 1973).

3.23. Both the San Pablo and Wildcat Creek marshes are designated as "potential regional shoreline" by the Plan. A regional shoreline is an area of land (and related water area) located on the edge of San Francisco Bay which has significant recreational, natural or scenic values.

3.24. Summary. From this brief discussion of the various plans that concern the area, it is apparent that the present landfill operation is at variance with those plans in regard to the preservation and maintenance of marshlands. The site plays an important part in all current plans as a future open space and recreation area.

4.00. THE PROBABLE IMPACT OF THE PROPOSED ACTION ON THE ENVIRONMENT

4.01. Impact on Land Use. Because of settlement (paragraph 4.24) and gas generation (paragraph 4.46) problems, special construction techniques must be employed when building on or near an active or completed landfill. The use of a completed landfill surface is usually restricted to light industry or to open space and recreational facilities.

4.02. The landfill site is presently designated for future use as a parks and shoreline recreation area (see paragraph 3.00). The adjacent marshland is designated to remain as open space. The landfill operation should have no impact on the land use of the immediate area.

4.03. Impacts on Vegetation and Wildlife. The worst threat to fish and wildlife of the Bay system is the continued degradation and destruction of the Bay's shallow water production zone which consists of tidal marshes, tidal mudflats, and open water less than 6 feet deep. A greater amount of the primary production of an estuarine system occurs at its edges rather than in its deeper portions. Therefore, a loss of production from a given amount of surface area at the edge of an estuary is worse than the loss incurred when an equal surface area in deep water is removed. Most marine life in the Bay either depends directly on the marshes and mudflats for its sustenance or indirectly depends upon them by feeding upon other marine life so nourished (BCDC, 1969).

4.04. The completion of the landfill would result in the removal approximately 350 acres from the shallow water production zone of San Pablo Bay; burial over one half square mile of tidal mudflat and tidal marsh; the splitting into two pieces the only major marsh of Contra Costa County's San Pablo Bay shoreline and degrade these two pieces of marshland which total well over a half of a square mile; and would adversely affect fish and wildlife and other estuarine organisms inhabiting the area.

4.05. Filling approximately 350 acres would remove from the San Pablo Bay system a segment of the highly productive shallow water production zone; the area of primary productivity in an estuary. The waters overlying the area would be displaced by fill material. The tidal mudflats and marshes would be buried under garbage and other debris thereby reducing primary productivity and the flow of nutrients and oxygen to adjacent waters. The landfill would interfere with the transport of particulate and dissolved organic matter from the mudflats and marshes to the bay system and its sedimentary subsystem and deprive these systems of a food source they depend upon.

4.06. The landfill would reduce the Bay's total prism and interfere with tidal circulation in the Castro Creek - Wildcat Creek marsh complex. The placement of the landfill would destroy the marsh along the San Pablo Bay front of the Castro Creek - Wildcat Creek marsh complex. This would result in changes in the tidal meanders of this marsh complex. Free movement of water through these meanders is necessary for flushing of the marsh and transportation of its primary production to the adjacent mudflats and nearby shallows and in turn to the rest of the bay.

4.07. The diking or cutting off of areas from tidal circulation would also reduce intertidal storage, reduce total productivity, and interfere with the flow of nutrients and oxygen throughout nearby waters. This would intensify the settling of sediment on the mudflats and undiked marshes of adjacent areas. With such works, the tidal prism is reduced and the location of the saline-fresh water boundary altered. Filling of tidelands and blocking of natural channels modifies current patterns and velocities resulting in erosion in one area or shoaling in another. Such changes upset the delicate balance of an ecosystem and profoundly influence the abundance and diversity of fish and wildlife species.

4.08. Landfill would have a direct adverse impact on fish and wildlife primarily through the displacement of these species from the area's land and water and indirectly through the elimination of many planktonic and benthic organisms upon which they feed. The destruction of the shallow water production zone would not only eliminate or reduce total productivity from this area but also reduce the carrying capacity of the adjacent areas because of the reduction of nutrient regeneration and production of organic matter into the bay system. The first reduction would be felt at the level of the detritus-algal consumers such as shrimp, amphipods, mysids, and small crabs. A lack of these important species limits the next trophic level which feeds upon them and in similar fashion the negative impact is felt on up the Bay's food chain. Because of the dependence of many species at the higher trophic levels on a few key consumer species able to utilize microalgae and plant detritus at the lower trophic levels, one cannot view damage to these species as insignificant but rather one must view the damage as significant since the damage would be reflected throughout the system.

4.09. Both the California Department of Fish and Game (1974) and the U.S. Fish and Wildlife Service (1974) recognize that the destruction of tidal marshes is the reason for the decline of the California clapper rail and the saltmarsh harvest mouse; both are endangered species (see paragraphs 2.44 and 2.45). The project under review would permanently remove habitat known to be utilized by these two species.

4.10. The loss of the shallow water production zone would result in a reduction of San Pablo Bay's ability to support fish and wildlife. This reduction of ability to support fish and wildlife will result in a reduction in numbers of fish and wildlife and a possible change in species composition. Species of fish, waterfowl, and migratory shore-birds that would be affected by this project are contained in Tables 4, 6 and 8.

4.11. Impeding tidal circulation in the Castro Creek - Wildcat Creek marsh complex, reducing the surface area of San Pablo Bay and reducing the volume of this bay would be reflected in an overall reduction of the biological benefits which the bay provides man, whether one's interest is fish and wildlife or pollution abatement.

4.12. In summary, landfill will:

- a. Destroy 243 acres of mudflat and 190 acres of marshland.
- b. Destroy over one mile, about 6,000 lineal feet, of marsh mudflat interface. This will be a destruction of over half the interface through which the Castro Creek - Wildcat Creek marsh's primary production will pass to the mudflats and Bay system.
- c. Have a detrimental affect on San Pablo Bay's subtidal sedimentary system and waters beyond and below the MLLW line.
- d. Destroy the major growing-edges of the Castro Creek - Wildcat Creek marsh complex.
- e. Impede tidal circulation and flushing of the Castro Creek - Wildcat Creek marsh complex.
- f. In a relatively instantaneous manner reduce San Pablo Bay's tidal prism and mudflats by an amount that would take the marshes over one hundred years to accomplish.

4.13. The open air spaces provided by marshes appear to help in decreasing air pollution (see paragraph 2.126). Many marsh plants can change a common air pollutant, carbon monoxide, into relatively harmless carbon dioxide and thus reduce the potential hazard of the poisonous gas. Additional research is needed to determine the extent of the role that marshes, or even impounded marshes, play in cleaning the air of major pollutants.

Geological Impacts.

4.14. Groundwater. The groundwater requiring protection against pollution lies at considerable depth below zones of inferior quality water (see paragraph 2.57). As shown on Plate 18, bay mud deposits exist beneath the entire landfill site. Thickening westward, they occur to a depth of at least 50 feet along the eastern boundary of the area and to at least 150 feet at the western boundary. Tests conducted on local bay mud samples obtained from the area determine the typical permeability to be on the order of 1.8×10^{-6} meinzers (Nevin and Ellis, 1971). (A permeability of one meinzer allows a movement of one gallon per day per square foot with a slope of one foot per foot). This would mean that, assuming an area of 350 acres having five feet of leachate within it, and also assuming that there was no water pressure within the 150 feet of bay mud and clay below it, the seepage from the 350 acres would be about .9 gallons per day.

4.15. In the absence of heavy pumping effect, both shallow and deep groundwater heads are at very shallow depths below the ground surface in the vicinity of the landfill. With well use now minor and continuing to decline (see paragraph 2.65), heads can be expected to be maintained at very shallow stages in the future. Such groundwater heads constitute a hydraulic barrier which will tend to prevent any downward seepage to buried aquifers from surface sources.

4.16. The bay mud, together with aquiclude clays extending from the east, form a local barrier of more than 150 feet of impermeable material over to deep aquifer zone. The subsurface geologic and hydrologic situation existing in the landfill area makes the seepage of leachate or gases from the sanitary landfill project to usable groundwater supplies a remote possibility. Individually, either the impermeability and thickness of the bay mud and other clays, or the positive groundwater gradients would be sufficient to prevent such seepage. Together, they represent an extraordinary degree of protection (Nevin and Ellis, 1971).

4.17. Lateral seepage from the existing Class I disposal pond through the existing fills is also a potential source of pollution of adjacent surface waters. The construction of impermeable dikes around the existing and proposed Class I disposal area (see paragraph 1.28) should prevent contamination of adjacent surface waters.

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DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, CORPS OF ENGINEERS
100 McALLISTER STREET
SAN FRANCISCO, CALIFORNIA 94102

REPLY TO
ATTENTION OF:

SPNED-E/SPNCO-R
PN 74-0-48

6 MAY 1975

TO WHOM IT MAY CONCERN:

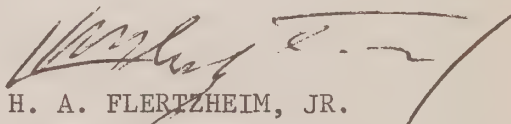
The San Francisco District, U.S. Army Engineers, is reviewing a permit application made by the Richmond Sanitary Service for the West Contra Costa Sanitary Landfill Project in Contra Costa County, California.

In response to the provisions of the National Environmental Policy Act of 1969, Public Law 91-190, to protect and enhance the quality of the human environment, the San Francisco District has prepared a Draft Environmental Statement. The inclosed statement of potential environmental impacts has involved informal coordination with Federal, State and local agencies with responsibility for, special interest in, or expertise on the project area.

The District is soliciting comments and views of appropriate government agencies, interested groups and individuals on the inclosed draft statement. Submission of comments within 45 days would be appreciated so that our final statement can more fully reflect your views.

Sincerely yours,

1 Inclosure
As stated


H. A. FLERTZHEIM, JR.
Colonel, CE
District Engineer

*we got it -
Call Berman. Review
see if she wants one*

4.18 While there is no evidence yet that leachate accumulation would occur, it has been suggested (Cooper, Clark and Associates, Dec. 1971) that at least two monitoring wells be installed in the Class I disposal area. The wells could consist of several-foot thickness of permeable material, approximately ten feet in diameter, placed on the bay mud surface, with a six-inch diameter pipe leading vertically from the permeable material to the final ground surface. Such wells would provide useful information on the depth and characteristic of any future leachate buildup. Leachate from Class II wells could be disposed of through the sewage treatment plant. One method of handling leachate from Class I areas is evaporation. Additional study is required to determine the best method.

4.19. Seepage through fill covers. During heavy rain, and possibly during irrigation of some areas, the subsoil layer (see paragraph 1.9) may become saturated for short periods. Depending on the material used for this layer and on the slopes involved, such flows could vary between 0.1 to 1 gallon per minute per 100 feet of width (Nevin and Ellis, 1971). Where opposing slopes come together in a swale, these flows all must move downstream in the swale, and the area of flow-way within the subsoil layer is, in effect, greatly reduced. Where several hundred or a few thousand feet of slope meet, a high-capacity drain, such as a "french drain"/filter rocks, or tile drain will be needed to prevent surface flows (Plate 4).

4.20 Impervious material for the final fill covers could be selected to provide a compacted permeability of not more than 0.0001 meinzers, but this material will be placed over refuse in which settlements can occur (see paragraph 4.24) and the settlement rates can vary considerably at different points.

4.21. Calculations using an effective permeability of 0.001 meinzers would indicate an average rate of total seepage into the 350 acres of sanitary fills of about 1.2 gallons per minute. However, leakage due to shear in the clay seal at points of different settlement, would probably exceed actual percolation and it is possible that flows of 100 gallons per minute or more could occur for short periods at some locations (Nevin and Ellis, 1971). Such large leaks would be noticed from the surface and repaired, and smaller leaks would tend to be self-healing in the clay layer. The total average continuous seepage through the 350 acres of fill cover would not be more than a few gallons per minute.

4.22. Flood protection. The existing levees at the mouth of San Pablo Creek should permit the required flood flows of 5100 cfs (paragraph 2.5.4) to spread over the remaining marsh into San Pablo Bay. The levee system for the landfill is far enough removed from Wildcat Creek to have little or no effect on flood flows.

4.23. Maximum tide level is estimated to be 7.0 feet (MSL) (see paragraph 2.70), therefore, the Class I area perimeter dikes should maintain at least a crest elevation above 7 feet for 50 years or more after construction (see paragraph 4.25). The possibility of flooding from overtopping of the San Pablo Reservoir dam is considered remote. EBMUD has recently undertaken a detailed investigation of the dam (see paragraph 2.81).

4.24. Settlement. Provisions should be made in the design and construction of the Class I area inclosing dike (see paragraph 1.30) to allow for future settlements. The underlying bay mud has undergone and will continue to undergo additional settlements due to weight of the proposed dike. Estimated settlements due to the weight of the dike, assuming its construction of Bay Mud, can be obtained from Plate 21. Some settlement has already occurred along the dike alignment due to the weight of the existing sanitary fills. The amount of settlement that has occurred to date can be approximated by using the curves presented on Plate 22.

4.25. Settlement analyses (Cooper-Clark & Associates, August 1972) indicate that, for those areas which are presently blanketed with sanitary fill to elevation 5 feet or above, perimeter dikes initially constructed to elevation 9.0 feet would maintain a crest elevation above the minimum specified elevation 7 feet for 50 years or more after construction (see paragraph 4.23). For those areas which are presently unfilled, an initial dike crest of 10 feet would be necessary to maintain an minimum crest elevation of 7 feet for a 50-year period.

4.26. Engineering studies have yet to be completed for Class II areas of the landfill operation (see paragraph 1.39). However, it can be expected that the settlement of refuse will be smallest where demolition and construction wastes are deposited and greatest in areas of primarily organic refuse. Some settlement is caused by further compaction of the materials, but most of it results as a result of biological and chemical decomposition of organic matter over a long period of time.

4.27. Seismic hazards. Seismic risks depend upon the characteristics of the earthquake, its magnitude and duration of shaking; the distance of structures and other improvements from the quake epicenter or the source faults; and the characteristics of the foundation materials. Earthquakes may result in damage as a consequence of the occurrence of one or more of the following events: ground failure, strong ground motion (shaking), and tsunamis and seiches.

4.28. Ground failure due to earthquakes may result from one or more of the following phenomena: surface rupture, including secondary fracturing; liquification; lurch cracking; landslide; and tectonic subsidence or uplift. In their soil engineering studies of the existing and proposed Class I disposal areas, Cooper-Clark and Associates (December 1971) concluded that the possibility of surface rupture occurring on the landfill site can not be accurately evaluated. However, since it is generally assumed that surface ruptures would most likely occur along existing planes of weakness, such as fault traces and previous zones of rupture, it appears to be unlikely that surface rupture would occur through the site during future earthquakes (see paragraph 2.75).

4.29. The southwesterly portion of the presently proposed barrel storage area is underlain at shallow depths by lenses and layers of generally low density clayey sands, which range in thickness from 1 1/2 to 8 feet. Testing and analysis (Cooper-Clark & Associates, April 1972) indicate that this material could liquify under major earthquake forces. However, since this portion of the storage area is located several hundred feet from the nearest property line, the effluent channel, or any other existing or potential free face, liquification of these sandy soils should not adversely affect the integrity of the inclosing dikes.

4.30. The perimeter dikes around both Class I disposal areas would be retained on their outboard sides to essentially their full height by refuse and dry fills. These surrounding fills will extend to at least 100 feet to the existing effluent channel and at least 150 feet to the nearest property line. In addition, the Class I disposal areas will generally be at a lower elevations than the surrounding areas. Therefore, there should be no dike failure, under either static or seismic conditions, that would permit the Group 1 wastes to escape from the specified disposal areas.

4.31. Strong ground motion (shaking) may result in damage to man-made structures. However, major structures will not be located on sanitary fills at the landfill site. Major structures or structures that would contain significant numbers of people that would be constructed as part of any future development in the area should be placed on conventional earth fills.

4.32. The possibility of overtopping of the Class I area appears to be remote (see paragraph 2.72), and damage if overtopping were to occur should be negligible (Cooper-Clark & Associates, December 1971).

4.33. Future study of the Class II Areas should be conducted when the extent of operation is known. The effect of a major earthquake on these sanitary landfills should be evaluated in detail, and their height and perimeter slope ratios should be determined accordingly.

Social and Economic Impacts.

4.34. Soild waste disposal. The continued operation of the site will permit the removal of solid and liquid waste material from the area served by the dump. Public health is served since improperly stored solid wastes attract flies and rodents. Without constant removal and disposal of society's residue, cities would be clogged and become inoperative. The wastes are currently being produced in great volume and capacity for disposal is urgently needed until a reduction in waste production can be effected. A significant reduction in waste production is not likely until major technological and economic changes are made. Alternate means of disposal are discussed in paragraph 6.05.

4.35. Growth inducement. Unlike other community support facilities such as sewage and water systems, sewage treatment plants, roads, and power plants, sanitary landfills have a finite operational lifetime and an undefined and variable rate of fill. Whereas a sewage treatment plant is often designed with excess flow capacity to accommodate growth in its tributary area, a sanitary landfill has no such physically definable flow capacity (rate of fill).

4.36. People do not choose their homes based upon the communities relative refuse disposal operation merits to any extent. On the other hand, industries and commercial enterprise generally are forced to plan their long-range plant location decision upon availability, costs, quality, and certainty of waste disposal service, among other factors. Because alternatives other than sanitary landfilling at the present site can be expected to cost considerably more to the County, and because such cost would be ultimately passed to the customer, absence of the project may slightly affect future industrial and commercial development. Growth and the concomitant increase in refuse disposal rates will shorten the life of a sanitary landfill.

4.37. Sanitary landfills generally induce growth in the area immediately surrounding the site. For local residents who may be inconvenienced while landfilling operations are in progress, there is generally some compensation in the form of improved land values through out the area once the landfill is completed. Since most completed sites have built-in limitations (see paragraph 4.01), they are best renewed for open space recreation areas. The private properties adjacent to these future recreation areas can provide the residents with an excellent opportunity to use and enjoy the recreational facilities. Future residential growth would thus be related to available recreation areas.

4.38. Public health and well-being. The disposal operations themselves present safety hazards to both site employees and users. Constant vehicular activity increases the chances for collision between collection vehicles, landfill equipment, and people on foot. The accident frequency rate among disposal site operators is one of the highest in all industries and municipal activities (Stearns and Ross, 1973). Constant vigilance and adherence to safety regulations will keep these hazards to a minimum.

4.39. The danger of water quality impairment has been discussed above (paragraph 4.16). With the indicated protection provided there will probably be no danger to public health from this source.

4.40. Rodents are present at the site, however, low capture rates indicate that there is not a case of severe rat infestation (see paragraph 2.99). Due to the distance involved, the rodents do not pose a threat to the residential community of North Richmond.

4.41. The impacts of the activity on air quality can also be considered as impacts on public health. These aspects are discussed in paragraph 4.44.

4.42. Recreation. Although there are no current approved plans to convert the landfill site into a recreation area (see paragraph 1.42), the area is designated for open space and recreation needs. Eventual use of the site as a recreation area will return it, if not to its original condition, to one which will most benefit the general public. The development of the site as a regional park, with emphasis on shoreline and Bay - associated activities, together in association with adjacent marsh and tidelands, would provide both important recreational and educational facilities for the area.

4.43. Visual Impacts. During the life of the landfill operation, the active portion of the working face and the immediate area on top of the fill will continue to be unsightly. The flat topography of the surrounding areas exposes the landfill to those visiting the area. The height of the fill will continue to have an unfavorable visual impact. The contrast with the natural environment presents an irregular landscape to the viewer. This irregularity can be expected to increase appreciably as a result of the placement of fills in the proposed fill area. The deteriorated view will be specially striking to those viewing it from the south and from the Bay.

4.44. Impacts on Air Quality. The majority of the 16 requirements imposed by the Court (see paragraph 1.22) have been implemented and followed by the Richmond Sanitary Service since late 1973. This has been responsible in part in the cessation of fires.

4.45. The evaporative emissions from the waste pond and barrel storage area are presently under study and have been the subject of extensive negotiation between the BAAPCD and consulting engineer hired by the Richmond Sanitary Service.

4.46. When conditions are proper, pyrolysis, which is the chemical decomposition of a material by heat in the absence of oxygen, probably causes other off-gases in the C_2C_3 range to be present. It is highly probable that ethane (C_2H_6) and ethylene (C_2H_4) are generated to some degree. Due to the inadequate supply of data regarding the presence and/or quality of these off-gases, no conclusions can be reached regarding the impact of these substances on local atmospheric conditions or upon the air-shed.

4.47. Contributions to air pollution from compacting and earth-moving equipment will remain unchanged during the life of the landfill.

4.48. Many of the air pollution problems attributed to transportation and circulation factors (see paragraph 2.111) could be alleviated by reducing the traffic flow which would come about with the closure of the landfill operation. If this site were closed, another would probably have to open elsewhere and the air pollution problems would be present at another location. This is a trade-off that would not change the district-wide air pollution profile, but would affect the localized air pollution problems experienced by the residents of the North Richmond area.

4.49. At exactly what stage of Bay filling a significant change in Bay Area climate would occur is difficult to answer. Based on available information, it is estimated that significant changes would be observed before 25 percent of the existing Bay water surface had been eliminated (BCDC, 1969). If a major portion of the Bay were filled more smog would occur. This is because radiation temperature - inversions, which trap air pollutants, occur more frequently over land surfaces than over water. The increase in smog would also be accelerated by the reduction in wind speeds, so that pollutants could not be disposed as rapidly as at present.

4.50. The importance of maintaining open land close to heavy populated areas as a means of controlling air pollution is discussed in paragraph 2.126.

4.51. The evaporative emissions from the waste pond have been investigated (see paragraph 2.116) and available information indicates that the liquid waste pond is not a source of emissions in violation of the rules and regulations of the BAAPCD (Murdock, 10 August 1974).

4.52. Noise Impacts. The level of noise due to the operation of the landfill itself, should have little impact on the residential area because of the distance involved. Noise contributed by waste disposal trucks transitting the area will remain.

4.53. Impacts on Historical and Archaeological Resources. Since there are no known archaeologic or historic resources at the site, there will be no impact, unless unsuspected or obscured resources are uncovered during excavation. The closeness of two archaeological sites to the landfill (see paragraph 2.130) indicates that the potential is high for subsurface archaeological resources to be present in the project area. It is recommended that construction personnel be advised of the possibility that a shell mound could be extant within the boundaries of the landfill site. In the event archaeological material are exposed during earth moving activity, such as road and dike construction, a professional archaeologist should be contracted immediately to allow examination and evaluation of the resources.

4.54. Impacts on Vehicular Circulation. The heavy volumes of through traffic in the North Richmond Area (see paragraph 2.131) are seriously detrimental to residential life in the neighborhood (Contra Costa County Planning Department, 1971). The traffic going to and from the landfill operation contributes to this problem.

4.55. Through traffic has been proposed to be removed by the construction of two bypass routes. The North Richmond Bypass to handle north-south traffic would be constructed from Castro Street to Parr Boulevard, skirting the western edge of residential North Richmond. The Castro-Chesly Bypass would handle east-west traffic and would extend present Castro Street northeast to Chesley Avenue. The ultimate location and development of these routes are too uncertain, at this time to warrant serious consideration of potential impact by the landfill operation.

4.56. The landfill will not have a significant impact on existing State highways in the vicinity which are Interstate Route 80 and State Highway Route 17 (Miller, 1974).

5.00. ANY PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH
CANNOT BE AVOIDED

5.01. The adverse impacts of the fill project include loss of a water-fowl resting area and some modified marsh habitat. A major degradation of the area occurred some years ago, before the preservation of the Bay and shore habitat became a major concern and before laws had been enacted to provide for such preservation.

5.02. Due to the nature of a sanitary landfill, i.e., settlement and gas generation, construction in this area will be restricted to light industry or open space and recreation areas.

5.03. During the life of the landfill operation, the site will continue to present an unsightly view.

5.04. The continued truck traffic through North Richmond will produce noise and air emissions.

6.00. ALTERNATIVES TO THE PROPOSED ACTION

6.01. Permit Denial. The two alternatives available to the Corps on the permit application from the Richmond Sanitary Service are either to grant or to deny the permit. The impacts from granting the permit are discussed in other sections of this Environmental Statement.

6.02. The West Contra Costa Sanitary Landfill Operation presently handles wastes from ten north bay cities and districts. Elimination of this site would require relocation of the site and/or an alternate means of disposal.

6.03. There are, at present, four Class I disposal sites in the San Francisco Bay Region. The West Contra Costa County site is the only Class I area which accepts general purpose type wastes. It is conceivable that the waste materials might be segregated according to material class and redistributed to other facilities, but this would probably result in a higher user cost.

6.04. If this sanitary landfill operation was not permitted to continue, both Contra Costa and Marin Counties would have to provide equivalent service. Marin County does have at its disposal, the Redwood Sanitary Landfill near Novato, California, which would be able to take the wastes currently deposited from Marin County at the Richmond site. There is no such site readily available to Contra Costa County. The County would have to organize a collection system, locate a site to receive solid waste, and be ready to deal with all the facets of the environmental impacts of solid waste collection at this new site. Any new site selected would have to meet the stringent requirements of a Class I site to receive that wastes from industry located in the County (Dias and Moriarty, 1972). Also, all the problems connected with land acquisition, maintenance of equipment and payroll for the new employees would become the County's and the public's burden.

6.05. Alternative means of disposal would include methods other than the current landfill project, such as: incineration, pyrolysis, and landfilling at other locations involving volume reduction such as baling or shredding of the solid wastes. Each of these methods is not necessarily free of environmental problems. These methods have higher costs than the current landfill project and these higher costs now restrict the use of these alternative methods in this area. During the currently projected lifetime of the subject landfill project, reclamation and recycling procedures will be implemented which will reduce the volume of materials requiring disposal at the subject site. The State Solid Waste Management Board is responsible for the

development of a statewide solid waste resource recovery program which should accelerate implementation of some of the alternative means of waste disposal discussed above (Burch, 1974). The West Coast Salvage Company is presently conducting a salvage operation at the site (see paragraph 2.93).

6.06. Area Restoration. It should be recognized that some 2.7 million cubic yards of garbage and fill have already been placed on approximately 194 acres of former tidelands in the shallow water production zone of San Pablo Bay. However, certain areas behind unauthorized levees while subject to reclamation could be restored to the shallow water production zone of San Pablo Bay. Approximately 155 acres of San Pablo Bay's shallow water production zone encompassed by the landfill project is restorable to tidal action: about 55 acres (Area IIC and part of IB) formerly regularly flooded tidal marsh could be restored to tidal action; and about 100 acres (Areas IID and IIE) of tidal mudflat is restorable to tidal action. Upon restoration of about 30 acres (Area IID) of mudflat could be expected to silt in and become marsh. The details of restoration are presented in paragraph 1.50.

6.07. These restoration considerations would present short-term pollution problems; however, if properly engineered, environmental effects could be minimized. The southern edge of the existing fill would have to be sealed to prevent seepage of leachate from Area IIB. Some of the Area IID would have to be utilized in the construction of any sealing levee. The waters of Area IID and IIE would have to be tested to see if they could be safely released into the Bay. If these waters would not be released, they would have to be treated or otherwise disposed. If the bottom sediments of Areas IID and IIE are found to be unacceptably polluted, they would have to be removed to a safe and acceptable upland location before tidal action could be restored. If the sediment and vegetation of the marsh in Areas IIC and IB are found polluted, this material would also have to be removed to an acceptable upland site. The most desirable stage of the tidal cycle at which to accomplish breaching of the levees must be determined. Should pollution problems prevent restoration, these areas could become part of a park and be retained and managed indefinitely for fish and wildlife.

7.00. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S
ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-
TERM PRODUCTIVITY

7.01. Since the installation of the West Contra Costa Sanitary Landfill Project, a considerable degradation of the marshland and mudflat area together with their associated vegetation and wildlife has occurred. It should be recognized that had this site not been used over the past 22 years, the solid wastes would have necessarily been disposed of in perhaps an equally socially or environmentally valuable canyon or alluvial plain. While no further encroachment of the Bay should be allowed, the loss of the ecological resource covered by the landfill has been the cost of providing much needed interim capacity for waste disposal. Resource recovery systems now under study as part of the State solid waste management plan may be feasible soon enough to result in a substantial decreased volume of wastes requiring landfill. Eventually an enhancement of recreational opportunities should be provided to an area seriously short of such facilities.

8.00. ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF
RESOURCES WHICH WOULD BE INVOLVED IN THE PROPOSED
ACTION SHOULD IT BE IMPLEMENTED

8.01. There are four major commitments of resources resulting from the West Contra Costa Sanitary Landfill Project: irreversible loss of 350 acres of marshland and mudflats; irretrievable loss of cover material; irretrievable loss of energy and resource value from solid wastes; and the irretrievable loss of wildlife habitat.

8.02. The landfill site was once an area of high productivity. Presently 190 acres have been removed from productivity and there is little chance this area could ever return to marshland. The remaining 160 acres have been degraded by diking and the presence of the landfill and future filling of this area will also destroy its value of a productive area. The Bay has lost over 75 percent of its marshlands through diking and filling.

8.03. The proposed fill comes from various sources throughout Contra Costa County (see paragraph 1.40). While records have not been maintained as the source and amount of cover material used at the site, the soil material transferred does represent an irreversible loss of resource from the borrow site. The ecology of the site from which the soil material will be removed will doubtlessly be affected to some extent. The soil cover, once applied to the landfill site, will be irretrievably lost.

8.04. With the exception of the small portion of resources recovered by the West Coast Salvage Company (see paragraph 2.93), all trash and refuse is buried permanently. In this age, when the public is becoming acutely aware of resource shortages, the loss of potentially recoverable material such as paper, bottles, scrap metals, rubber, plastics, and synthetics in the disposal operation becomes more pronounced. Recovery of energy from solid wastes can be achieved primarily by burning the combustible fraction of the refuse in specially designed power generators; tapping the methane gas generated in the decomposing fill; and preparing liquid fuel through pyrolysis.

8.05. The loss of wildlife habitat is irretrievable and is discussed in further detail in paragraph 4.03. The overall decrease in habitat area will affect the equilibrium of adjacent areas. The new habitat provided upon the final fill will not approximate the lost initial habitat, even though it will be used by a different, less diverse population.

9.00. COORDINATION AND COMMENTS AND RESPONSES

9.01. Public Participation. The application for a Department of the Army permit by the Richmond Sanitary Service was first announced by the San Francisco District in Public Notice 74-0-48, 2 October 1973 (Document A-9, Appendix A). In accordance with Department of the Army (May 1973) Regulations, comments were solicited from the general public as well as from Federal, State, and local agencies. Current regulations state that "...public hearings will be held upon written request whenever the District Engineer determines that there is sufficient public interest to warrant such action" (Department of the Army, 1975).

9.02. Government Agencies. Comments on the Public Notice announcing the permit application are required from the U.S. Department of the Interior, U.S. Department of Commerce, the U.S. Environmental Protection Agency, and the California State Resources Agency. Briefly, the U.S. Environmental Protection Agency did not comment on the Public Notice pending preparation of an Environmental Statement. The Department of the Interior, Fish and Wildlife Service, objects to the issuance of a permit authorizing the placement of further fill in Areas IIC, IID, IIE, a portion of IB, and the triangular tract on the east bank of San Pablo Creek. Provided the recommendations, or acceptable modifications of the recommendations, discussed in paragraph 1.50 are incorporated as conditions of a Corps permit, the Department will not object to the authorization of the existing 2,700,000 cubic yards of fill. The Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service objects to the future filling of areas which are restorable to tidal action and to the authorization of levees which deny tidal action to these areas. The Service will not object to the existing fill if recommendations similar to those of the Fish and Wildlife Service are incorporated as conditions of the permit. Comments on the Public Notice have not been received from the State Resources Agency.

9.03. After determining that an Environmental Statement would be required prior to administrative action on the permit application, the San Francisco District prepared an Environmental Working Paper (Department of the Army, December 1973). An Environmental Impact Report prepared by Environmental Assessment Engineering (1973) was the source for much of the information for this paper. The Working Paper was circulated to various Federal, State and local agencies, and citizen groups for their informal review and comment. Comments were received from the following agencies:

U.S. Department of Health, Education, and Welfare

U.S. Department of Commerce
National Marine Fisheries Service

U.S. Department of the Interior
National Park Service
Fish and Wildlife Service
Bureau of Outdoor Recreation

U.S. Department of Transportation

U.S. Environmental Protection Agency

California State Resources Agency
Department of Parks and Recreation
State Historic Preservation Officer
Department of Navigation and Ocean Development
Department of Fish and Game
State Water Resources Control Board
Division of Mines and Geology
State Solid Waste Management Board

California Health and Welfare Agency
Department of Health

California Business and Transportation Agency
Department of Transportation

Bay Area Air Pollution Control District

Contra Costa County Planning Department

City of Richmond Planning Department

9.04. Citizen Groups. The major interests indicated in comments received on the Public Notice announcing the permit application was related to loss of the Bay due to fill; the stopping of all Bay fill; flood and seismic hazards; the ecological value of the area; the value of the area as part of the Pacific Flyway; the use of alternate means of waste disposal; pollution of the Bay; social and economic problems; and the desire for a public meeting.

9.05. Comments on the Working Paper were received from the following conservation groups:

West Contra Costa Conservation League
Contra Costa Shoreline Parks Committee
Northern California Committee for Environmental Information
Save San Francisco Bay Association

9.06. The concerns expressed paralleled those received on the Public Notice. The comments received on the Working Paper have resulted in extensive revision, rewrite, and coordination culminating in this Draft Environmental Statement.

9.07. Comments and Responses. The questions and issues raised by this Draft Environmental Statement, along with copies of the letters of comments, and appropriate responses will be included in the Final Environmental Statement.

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TABLES

TABLE 1

Partial List of Wetland and Other Plants at the West Contra Costa Sanitary
Landfill Project Site and Adjacent Areas

| COMMON NAME | SCIENTIFIC NAME |
|-------------------|----------------------------------|
| Filaree | <u>Erodium cicutarium</u> |
| Mustard | <u>Brassica</u> sp. |
| Wild radish | <u>Raphanus sativus</u> |
| Spergularia | <u>Spergularia marina</u> |
| Dock | <u>Runex</u> sp. |
| Common knotweed | <u>Polygonum aviculare</u> |
| Saltbush | <u>Atriplex</u> sp. |
| Common pickleweed | <u>Salicornia pacifica</u> |
| Plantain | <u>Plantago</u> sp. |
| Bur-clover | <u>Medicago hispida</u> |
| Sweet-clover | <u>Melilotus indicus</u> |
| Vetch | <u>Vicia</u> sp. |
| Poison hemlock | <u>Conium maculatum</u> |
| Gum plant | <u>Grindelia</u> sp. |
| Pineapple weed | <u>Matricaria matricarioides</u> |
| Brass buttons | <u>Cotula coronopifolia</u> |
| Groundsel | <u>Senecio</u> sp. |
| Milk thistle | <u>Silybum marianum</u> |
| Italian thistle | <u>Carduus pycnocephalus</u> |
| Ox tongue | <u>Picris echioides</u> |
| Sow-thistle | <u>Sonchus oleraceus</u> |
| Cattail | <u>Typha</u> sp. |
| Bulrush | <u>Scirpus</u> sp. |
| Bulrush | <u>Scirpus robustus</u> |
| Bromegrass | <u>Bromus</u> sp. |
| Salt grass | <u>Distichlis</u> sp. |
| Barley | <u>Hordeum</u> sp. |
| Ryegrass | <u>Lolium</u> sp. |
| Wild oat | <u>Avena fatua</u> |
| Beard grass | <u>Polypogon</u> sp. |

Source: Reese, 1975

TABLE 2

Planktonic Organisms Found Over the Intertidal and Subtidal Areas in the
Vicinity of the West Contra Costa Sanitary Landfill Project

SPECIES

NEMATODA

Unidentified nematode

ANNELIDA

Polychaeta

Unidentified polychaete larvae

ARTHROPODA

Crustacea

Copepoda

Acartia clausi

Acartia sp.

Epilabadocera amphirites

Tortanus discaudatus

Eurytemora sp.

Oithona sp.

Unidentified Harpacticoid copepod

Decapoda

Crago franciscorum

Unidentified Anomuran zoea

Unidentified Brachyuran zoea

Isopoda

Unidentified parasitic isopod

Chelifera

Unidentified Cheliferan

MOLLUSCA

Gastropoda

Unidentified larvae

Pelecypoda

Unidentified larvae

TABLE 3

Benthos Found in the Vicinity of the West Contra Costa Sanitary Landfill
Project

SPECIES

ANNELIDA

Polychaeta

Streblospio benedicti

Capitella capitata

Etone californica

Neanthes succinea

Polydora sp.

Unidentified Cirratuled polychaete

Oligochaeta

Unidentified oligochaete(s)

MOLLUSCA

Gastropoda

Unidentified gastropod

Ilyanassa obsoleta

Pelecypoda

Clinocardium nuttallii

Gemma gemma

Macoma inconspicua

Macoma nasata

Mya arenaria

Protothoca semidecussata

Vasella demissa

Mytilus edulus

ARTHROPODA

Crustacea

Amphipoda

Unidentified amphipod

Balanus improvisus

CHORDATA

Tunicata

Unidentified Ascidian larvae

Vertebrata

Unidentified fish larvae

Unidentified fish eggs

TABLE 4

Partial List of Birds of West Contra Costa Sanitary Landfill Project
Site and Adjacent Areas.

| COMMON NAME | SCIENTIFIC NAME | SEASON AND RELATIVE ABUNDANCE | | | |
|---------------------------|----------------------------------|----------------------------------|---|---|---|
| | | S | S | F | W |
| LOONS | | | | | |
| Common loon | <u>Gavia immer</u> | | | | 0 |
| Red-throated loon | <u>Gavia stellata</u> | | | | 0 |
| GREBES | | | | | |
| Eared grebe | <u>Podiceps caspicus</u> | A | U | C | A |
| Western grebe | <u>Aechmophorus occidentalis</u> | C | U | C | C |
| Pied-billed grebe | <u>Podilymbus podiceps</u> | C | C | C | C |
| PELICANS | | | | | |
| Brown pelican | <u>Pelecanus occidentalis</u> | | 0 | 0 | 0 |
| CORMORANTS | | | | | |
| Double-crested cormorant | <u>Phalacrocorax auritus</u> | U | 0 | A | A |
| HERONS and BITTERNS | | | | | |
| Great blue heron | <u>Ardea herodias</u> | C | C | C | C |
| Great egret (common) | <u>Casmerodius albus</u> | C | C | C | C |
| Snowy egret | <u>Leucophoyx thula</u> | A | A | A | A |
| Black-crowned night heron | <u>Nycticorax nycticorax</u> | C | C | C | C |
| American bittern | <u>Botaurus lentiginosus</u> | U | U | U | U |
| DUCKS | | | | | |
| Mallard | <u>Anas platyrhynchos</u> | C | C | C | C |
| Gadwall | <u>Anas strepera</u> | U | 0 | C | C |
| Pintail | <u>Anas acuta</u> | C | C | A | A |
| Green-winged teal | <u>Anas carolinensis</u> | 0 | 0 | 0 | U |
| Blue-winged teal | <u>Anas discors</u> | R | R | 0 | 0 |
| Cinnamon teal | <u>Anas cyanoptera</u> | C | U | U | C |
| Northern shoveler | <u>Spatula clypeata</u> | C | U | A | A |
| American wigeon | <u>Mareca americana</u> | U | U | C | A |
| Redhead | <u>Aythya americana</u> | R | | 0 | 0 |
| Canvasback | <u>Aythya valisineria</u> | C | 0 | C | A |
| Greater scaup | <u>Aythya marila</u> | U | R | 0 | C |
| Lesser scaup | <u>Aythya affinis</u> | A | 0 | A | A |
| Common goldeneye | <u>Bucephala clangula</u> | U | R | U | U |

Table 4 cont.

| COMMON NAME | SCIENTIFIC NAME | SEASON AND RELATIVE ABUNDANCE | | | |
|------------------------------------|------------------------------------|----------------------------------|---|---|---|
| | | S | S | F | W |
| DUCKS (Continued) | | | | | |
| Barrow's goldeneye | <u>Bucephala islandica</u> | R | | O | O |
| Bufflehead | <u>Bucephala albeola</u> | U | O | C | C |
| White-winged scoter | <u>Melanitta deglandi</u> | R | | U | U |
| Surf scoter | <u>Melanitta perspicillata</u> | U | R | C | C |
| Black scoter | <u>Oidemia nigra</u> | | | O | O |
| Ruddy duck | <u>Oxyura jamaicensis</u> | C | C | A | A |
| KITE, HAWKS, and HARRIER | | | | | |
| White-tailed kite | <u>Elanus leucurus</u> | C | C | C | C |
| Red-tailed hawk | <u>Bueto jamaicensis</u> | C | C | C | C |
| Marsh hawk | <u>Circus cyaneus</u> | C | C | C | C |
| FALCON | | | | | |
| American kestrel (sparrow hawk) | <u>Falco sparverius</u> | C | C | C | C |
| QUAIL and PHEASANT | | | | | |
| California quail | <u>Lophorlyx californicus</u> | U | U | U | U |
| Ring-necked pheasant | <u>Phasianus colchicus</u> | C | C | C | C |
| RAILS, GALLINULE, and COOT | | | | | |
| Clapper rail | <u>Rallus longirostris</u> | U | U | U | U |
| Virginia Rail | <u>Rallus limicola</u> | U | U | U | U |
| Sora | <u>Porzana carolina</u> | U | U | U | U |
| Common gallinule | <u>Gallinula chloropus</u> | O | O | O | O |
| American coot | <u>Fulica americana</u> | C | C | C | A |
| PLOVERS and TURNSTONES | | | | | |
| Semipalmated plover | <u>Charadrius semipalmatus</u> | | O | O | O |
| Snowy plover | <u>Charadrius alexandrinus</u> | U | C | U | U |
| Killdeer | <u>Charadrius vociferus</u> | C | C | C | C |
| American golden plover | <u>Pluvialis dominica</u> | R | | R | R |
| Black-bellied plover | <u>Squatarola squatarola</u> | C | R | C | C |
| Ruddy turnstone | <u>Arenaria interpres</u> | | | O | U |
| Black turnstone | <u>Arenaria melanocephala</u> | | | U | U |
| SANDPIPERS | | | | | |
| Common snipe | <u>Capella gallinago</u> | U | | U | U |
| Long-billed curlew | <u>Numenius americanus</u> | C | O | C | C |
| Whimbrel | <u>Numenius phaeopus</u> | U | R | O | O |
| Spotted sandpiper | <u>Actitis macularia</u> | | | R | R |
| Wandering tattler | <u>Heteroscelus incanum</u> | | R | R | R |
| Willet | <u>Catoptrophorus semipalmetus</u> | A | C | A | A |
| Greater yellowlegs | <u>Totanus melanoleucus</u> | C | U | C | C |
| Lesser yellowlegs | <u>Totanus flavipes</u> | O | O | O | O |

Table 4 cont.

| COMMON NAME | SCIENTIFIC NAME | SEASON AND RELATIVE ABUNDANCE | | | |
|------------------------|---------------------------------|----------------------------------|---|---|---|
| | | S | S | F | W |
| SANDPIPERS (Continued) | | | | | |
| Red knot | <u>Calidris canutus</u> | U | O | U | U |
| Pectoral sandpiper | <u>Erolia melanotos</u> | R | R | R | |
| Baird's sandpiper | <u>Erolia bairdii</u> | | R | R | |
| Least sandpiper | <u>Erolia minutilla</u> | C | C | A | A |
| Dunlin | <u>Erolia alpina</u> | C | | A | A |
| Short-billed dowitcher | <u>Limnodromus griseus</u> | C | U | C | C |
| Long-billed dowitcher | <u>Limnodromus scolopaceus</u> | C | O | C | C |
| Western sandpiper | <u>Ereunetes mauri</u> | A | C | A | A |
| Marbled godwit | <u>Limosa fedoa</u> | A | C | A | A |
| Sanderling | <u>Crocethia alba</u> | U | R | U | U |
| AVOCET and STILT | | | | | |
| American avocet | <u>Recurvirostra americana</u> | C | C | A | A |
| Black-necked stilt | <u>Himantopus mexicanus</u> | C | C | C | C |
| PHALAROPES | | | | | |
| Red phalarope | <u>Phalaropus fulicarius</u> | R | | R | R |
| Wilson's phalarope | <u>Steganopus tricolor</u> | U | C | U | |
| Northern phalarope | <u>Lobipes lobatus</u> | C | C | C | R |
| GULLS and TERNS | | | | | |
| Glaucous gull | <u>Larus hyperboreus</u> | O | | R | O |
| Glaucous-winged gull | <u>Larus glaucescens</u> | A | U | A | A |
| Western gull | <u>Larus occidentalis</u> | U | U | C | U |
| Herring gull | <u>Larus argentatus</u> | A | O | C | A |
| Thayer's gull | <u>Larus argentatus thayeri</u> | U | | U | U |
| California gull | <u>Larus californicus</u> | A | A | A | A |
| Ring-billed gull | <u>Larus delawarensis</u> | C | C | A | A |
| Mew gull | <u>Larus canus</u> | R | | R | O |
| Franklin's gull | <u>Larus pipixcan</u> | | | R | R |
| Bonaparte's gull | <u>Larus philadelphia</u> | A | C | A | A |
| Heermann's gull | <u>Larus heermanni</u> | | | R | R |
| Forster's tern | <u>Sterna forsteri</u> | C | C | A | O |
| Common tern | <u>Sterna hirundo</u> | R | R | O | |
| Least tern | <u>Sterna albifrons</u> | R | R | R | |
| Elegant tern | <u>Thalasseus maximus</u> | R | O | O | |
| Caspian tern | <u>Hydroprogne caspia</u> | O | C | C | |
| Black tern | <u>Chlidonias niger</u> | R | R | R | |
| DOVES | | | | | |
| Mourning dove | <u>Zenaidura macroura</u> | U | U | U | U |

Table 4 cont.

| COMMON NAME | SCIENTIFIC NAME | SEASON AND RELATIVE ABUNDANCE | | | |
|------------------------|--------------------------------|----------------------------------|---|---|---|
| | | S | S | F | W |
| OWLS | | | | | |
| Barn owl | <u>Tyto alba</u> | U | U | U | U |
| Burrowing owl | <u>Speotyto cunicularia</u> | C | C | C | C |
| Short-eared owl | <u>Asio flammeus</u> | U | U | U | U |
| KINGFISHER | | | | | |
| Belted kingfisher | <u>Megaceryle alcyon</u> | O | R | U | U |
| WOODPECKER | | | | | |
| Common flicker | <u>Colaptes cafer</u> | U | U | U | U |
| SWALLOW | | | | | |
| Barn swallow | <u>Hirundo rustica</u> | A | A | C | |
| CROW | | | | | |
| Common crow | <u>Corvus brachyrhynchos</u> | R | R | R | R |
| WREN | | | | | |
| Long-billed marsh wren | <u>Telmatodytes palustris</u> | C | C | C | C |
| MOCKINGBIRD | | | | | |
| Mockingbird | <u>Mimus polyglottos</u> | O | O | O | O |
| PIPIT | | | | | |
| Water pipit | <u>Anthus spinoletta</u> | C | | C | C |
| STARLING | | | | | |
| Starling | <u>Sturnus vulgaris</u> | C | C | C | C |
| WEAVER FINCH | | | | | |
| House sparrow | <u>Passer domesticus</u> | C | C | C | C |
| BLACKBIRDS and ORIOLES | | | | | |
| Western meadowlark | <u>Sturnella neglecta</u> | C | C | C | C |
| Red-winged blackbird | <u>Agelaius phoeniceus</u> | C | C | C | C |
| Tricolored blackbird | <u>Agelaius tricolor</u> | U | U | U | U |
| Brewer's blackbird | <u>Euphagus cyanocephalus</u> | A | A | A | A |
| Brown-headed cowbird | <u>Molothrus ater</u> | U | O | O | O |
| FINCHES and SPARROWS | | | | | |
| Purple finch | <u>Carpodacus purpureus</u> | R | | | R |
| House finch | <u>Carpodacus mexicanus</u> | C | C | C | C |
| American goldfinch | <u>Spinus tristis</u> | C | C | C | C |
| Lesser goldfinch | <u>Spinus psaltria</u> | C | C | C | U |
| Rufous-sided towhee | <u>Pipilo erythrophthalmus</u> | U | U | U | U |
| Brown towhee | <u>Pipilo fuscus</u> | U | U | U | U |

Table 4 cont.

| COMMON NAME | SCIENTIFIC NAME | SEASON AND RELATIVE ABUNDANCE | | | |
|--------------------------|-----------------------------------|----------------------------------|---|---|---|
| | | S | S | F | W |
| FINCHES and SPARROWS | | | | | |
| Savannah sparrow | <u>Passerculus sandwinchensis</u> | C | C | C | C |
| Dark-eyed junco (Oregon) | <u>Junco oreganus</u> | O | | O | O |
| White-crowned sparrow | <u>Zonotrichia leucophrys</u> | C | | C | C |
| Golden-crowned sparrow | <u>Zonotrichia atricapilla</u> | O | | U | C |
| Fox sparrow | <u>Passeralla iliaca</u> | U | | U | U |
| Lincoln's sparrow | <u>Melospiza lincolni</u> | U | | U | U |
| Song sparrow | <u>Melospiza melodia</u> | A | A | A | A |

1/

SEASON

S - Spring March-May
 S - Summer June-August
 F - Fall September-November
 W - Winter December-February

2/

RELATIVE ABUNDANCE

A - Abundant - A common species which is very numerous.
 C - Common - Certain to be seen or heard in suitable habitat.
 U - Uncommon - Present, but not certain to be seen
 O - Occasional - Seen only a few times during a season.
 R - Rare - Seen at intervals of 2 to 5 years.

Source: Reese, 1975

TABLE 5

Principal Species of Ducks Wintering in the San Francisco Bay Area
Associated with the West Contra Costa Sanitary Landfill Project

| COMMON NAME | SCIENTIFIC NAME |
|-------------------|---------------------------|
| Pintail | <u>Anas acuta</u> |
| American wigeon | <u>Mareca americana</u> |
| Mallard | <u>Anas platyrhynchos</u> |
| Northern shoveler | <u>Spatula clypeata</u> |
| Greenwing teal | <u>Anas carolinensis</u> |
| Ruddy duck | <u>Oxyura jamaicensis</u> |
| Canvasback | <u>Aythya valisineria</u> |
| Greater scaup | <u>Aythya marila</u> |
| Lesser scaup | <u>Aythya affinis</u> |
| Gadwall | <u>Anas strepera</u> |

Source: Reese, 1975

TABLE 6

Mammals in the West Contra Costa Sanitary Landfill Project Area

| COMMON NAME | SCIENTIFIC NAME |
|----------------------------|------------------------------------|
| Shrew | <u>Sorex sp.</u> |
| House mouse | <u>Mus musculus</u> |
| Salt marsh harvest mouse | <u>Reithrodontomys raviventris</u> |
| Western harvest mouse | <u>Reithrodontomys megalotis</u> |
| California meadow mouse | <u>Microtus californicus</u> |
| Norway rat | <u>Rattus norvegicus</u> |
| Black rat | <u>Rattus rattus</u> |
| Audubon's cottontail | <u>Sylvilagus auduboni</u> |
| Black-tailed hare | <u>Lepus californicus</u> |
| Striped skunk | <u>Mephitis mephitis</u> |
| California ground squirrel | <u>Citellus beecheyi</u> |
| Raccoon | <u>Procyon lotor</u> |
| Opossum | <u>Didelphis marsupialis</u> |

Source: EAE, 1973

TABLE 7

SURVEY OF BENTHIC ORGANISMS*
DIKED-IN PONDS

| <u>Organisms per Square Foot</u> | | | |
|---|--|---------------------|---------------------------|
| <u>Species</u> | <u>Eastern Pond</u> | <u>Western Pond</u> | <u>Intertidal Mudflat</u> |
| Mollusca | | | |
| <u>Macoma</u> sp. (clams) | | -- | 18 |
| Annelida (segmented worms) | NIL | | |
| Polychaeta unid. | | 24 | 70 |
| <u>Streblospio</u> sp. | | -- | 1315 |
| Oligochaeta Unid. | | 332 | 3733 |
| Unidentified | | 12 | -- |
| Arthropoda | | | |
| Amphipoda unid. | | | 35 |
| <u>Eastern Pond</u> | (composite of 2 samples) | | |
| Substrate: | Blackish mud composed of small charcoal particles, oil globules, abundance of clay, moderate amounts of sand, little silt, and decomposed organic material. Very malodorous. | | |
| No living organisms found in the analysis of 1/4 of the total sample. | | | |
| <u>Western Pond</u> | | | |
| Substrate: | Blackish mud composed of oil globules, moderate amounts of silt and sand, little clay, and decomposed organic material. Abundant algal growth. Malodorous. | | |
| <u>Intertidal Mudflat</u> | (3/5 of the composite of 3 samples) | | |
| Location: | Intertidal mud flat, 80 yards offshore from northeast dike. | | |
| Substrate: | Greyish black mud, composed of silt, clay, and decomposed organic material. Very malodorous. | | |

*Taken with an Ekman dredge (6-inch type).

Samples washed through a No. 30 screen board (.59 mm clear opening).

Source: EAE, 1973

TABLE 8

Fish Species Found in the Intertidal and Subtidal Areas of San Pablo Bay

| COMMON NAME | SCIENTIFIC NAME | RELATIVE ABUNDANCE | | |
|----------------------------|------------------------------------|--------------------|------|-------|
| | | YOUNG | JUV. | ADULT |
| Bay ray | <u>Myliobatis californica</u> | | U | |
| American shad | <u>Alosa sapidissima</u> | | U | |
| Pacific herring | <u>Clupea harengus pallasii</u> | | U | |
| Threadfin shad | <u>Dorosoma petenense</u> | | U | |
| Northern anchovy | <u>Engraulis mordax</u> | C | C | U |
| Coho salmon | <u>Oncorhynchus kisutch</u> | U | | |
| Chinook salmon | <u>Oncorhynchus tshawytscha</u> | U | | |
| Surfsmelt | <u>Hypomesus pretiosus</u> | C | C | |
| Delta smelt | <u>Hyposesus transpacificus</u> | | U | |
| Osmeridae (unidentified) | | C | | |
| Carp | <u>Cyprinus carpio</u> | | | U |
| Splittail | <u>Pogonichthys macrolepidotus</u> | | C | C |
| Sacramento squawfish | <u>Ptychocheilus grandis</u> | | U | |
| Sacramento sucker | <u>Catostomus occidentalis</u> | | U | |
| Topsmelt | <u>Atherinops affinis</u> | C | A | |
| Jacksmelt | <u>Atherinopsis californiensis</u> | | | R |
| Atherinidae (unidentified) | | C | | |
| Threespine stickleback | <u>Casterosteus aculeatus</u> | C | C | C |
| Striped bass | <u>Morone saxatilis</u> | A | A | |
| Shiner perch | <u>Cymatogaster aggregata</u> | C | A | A |
| Black perch | <u>Embiotoca jacksoni</u> | | U | U |
| Walleye surfperch | <u>Hyperprosopon argenteum</u> | | U | |
| Pile perch | <u>Rhacochilus vacca</u> | | U | |
| Yellowfin goby | <u>Acanthogobius flavimanus</u> | | C | C |
| Bay goby | <u>Lepidogobius lepidus</u> | - | - | - |
| Pacific staghorn sculpin | <u>Leptocottus armatus</u> | C | A | |
| English sole | <u>Parophrys vetulus</u> | U | | |
| Starry flounder | <u>Platichthys stellatus</u> | C | A | U |
| Grass shrimp | <u>Palamon macrodactylus</u> | C | C | C |
| Bay shrimp | <u>Crago sp.</u> | C | C | C |
| Mud crab | <u>Hemigraspus oregonensis</u> | | C | C |
| Dungeness crab | <u>Cancer magister</u> | | U | |

Symbols: A - Abundant; C - Common; U - Uncommon.

Source: Reese, 1975

TABLE 9

EARTHQUAKES THAT COULD HAVE OR DID CAUSE
DAMAGE IN THE RICHMOND AREA

| <u>DATE</u> | <u>FAULT</u> | <u>MAXIMUM</u> <u>INTENSITY (M.M.)</u> ^{1/} | <u>MAGNITUDE</u> ^{2/} |
|------------------|-------------------------|---|--------------------------------|
| 10 June 1836 | Hayward | X | --- |
| June 1838 | San Andreas | X | --- |
| 15 May 1851 | ? | VI? | --- |
| 15 February 1856 | Hayward | VIII+ | --- |
| 26 November 1858 | Hayward or Calaveras | VIII-IX | --- |
| 3 July 1861 | Calaveras? | VIII? | --- |
| 5 March 1864 | Hayward- Calaveras? | VII+? | --- |
| 8 October 1865 | San Andreas | IX-X | --- |
| 21 October 1868 | Hayward | X+ | --- |
| 25 March 1884 | San Andreas? | VI | --- |
| 19 April 1892 | Midland? | IX | --- |
| 30 March 1898 | ? (Mare Island) | VIII+ | --- |
| 2 August 1903 | Hayward | VIII+ | --- |
| 18 April 1906 | San Andreas | X+ | 8.25 |
| 1 July 1911 | Hayward | IX | 6.6 |
| 7 October 1915 | Hayward | VI | --- |
| 8 March 1937 | Hayward | VII | 4.5 |
| 23 October 1955 | Calaveras | VII | 5.4 |
| 22 March 1957 | San Andreas | VII | 5.3 |

NOTES: 1/ Modified Mercalli Scale (VI is lowest intensity that involves some damage to structures)

2/ Richter Scale

Source: Bishop and Knox, 1973

TABLE 10

EPICENTERS LOCATED IN RICHMOND AREA (1910 - 1968)^{1/}

| <u>DATE</u> | <u>MAGNITUDE</u> ^{2/} | <u>DATE</u> | <u>MAGNITUDE</u> |
|-------------|--------------------------------|-------------|------------------|
| 1910-1919 | No events recorded | 2/24/55 | 2.3 |
| 9/4/19 | --- | 3/11/55 | 2.5 |
| 12/26/25 | --- | 4/14/55 | 2.0 |
| 9/5/31 | --- | 8/17/55 | 1.3 |
| 9/25/42 | --- | 8/17/55 | 1.3 |
| 5/9/45 | 2.6 | 8/18/55 | 2.5 |
| 11/10/46 | 2.0 | 4/2/56 | 2.8 |
| 7/21/48 | 2. | 12/20/56 | 2.1 |
| 8/8/49 | 3.3 | 4/27/57 | 2.6 |
| 4/16/50 | 3.4 | 5/15/57 | 3.3 |
| 7/17/50 | 2.1 | 5/15/57 | 2.3 |
| 8/15/50 | 2.9 | 5/15/57 | 2.6 |
| 7/24/51 | 3.2 | 5/17/57 | 2.1 |
| 7/24/51 | 3.9 | 6/6/58 | 2.0 |
| 7/29/51 | 0.5? ^{3/} | 12/17/59 | 2.3 |
| 11/29/51 | 2.5 | 3/19/60 | 1.5 |
| 3/5/52 | --- | 3/3/62 | 2.1 |
| 3/22/52 | --- | 4/12/64 | 2.4 |
| 1/15/53 | 2.0 | 11/24/64 | 2.3 |
| 12/10/53 | 1.8 | 6/3/66 | 2.5 |
| 8/21/54 | 2.1 | 6/5/69 | 2.8 |
| 1/10/55 | 2.6 | 10/21/68 | 3.4 |

NOTES: ^{1/} Epicenters located by University of California, Berkeley
 area: 37.88° to 38.01° N. Latitude
 122.25° to 122.44° W. Longitude

^{2/} Richter Scale

^{3/} Magnitude probably is misprinted on Berkeley Epicenter tape.

Source: Bishop and Knox, 1973

TABLE 11

EPICENTERS LOCATED IN RICHMOND AREA (1969-1972)^{1/}

| <u>DATE</u> | <u>N. LATITUDE</u> ^{2/} | <u>W. LONGITUDE</u> ^{2/} | <u>MAGNITUDE</u> ^{3/} |
|-------------|----------------------------------|-----------------------------------|--------------------------------|
| 11/6/69 | 37° 58.6' | 122° 20.6' | 2.1 |
| 4/23/70 | 37° 56.4' | 122° 18.6' | 1.7 |
| 11/11/70 | 37° 55.8' | 122° 16.9' | 1.8 |
| 1/13/71 | 37° 55.7' | 122° 17.0' | 1.5 |
| 5/10/71 | 37° 54.8' | 122° 16.7' | 1.2 |
| 11/22/71 | 37° 55.6' | 122° 17.6' | 1.6 |

NOTES: 1/ Epicenters located by U.S. Geologic Survey
 37° 52.5' to 38° 1.0' N. Latitude
 122° 15.0' to 122° 27.0' W. Longitude

2/ Maximum epicentral errors on the order of ± 2 kilometers

3/ Richter Scale

Source: Bishop and Knox, 1973

TABLE 12

PROJECTED POPULATION 1970-2020
WEST CONTRA COSTA COUNTY

| Projected Growth Assumption ^{1/} | <u>1970</u> | <u>1975</u> | <u>1980</u> | <u>1985</u> | <u>1990</u> | <u>1995</u> | <u>2000</u> | <u>2010</u> | <u>2020</u> |
|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| High | 188,618 | 187,554 | 192,710 | 202,583 | 214,176 | 225,571 | 236,595 | | |
| Low | 188,618 | 185,967 | 188,682 | 196,319 | 202,632 | 208,073 | 212,269 | | |
| <hr/> | | | | | | | | | |
| Projected Populations ^{2/} | 190,000 | | 217,000 | | 241,000 | | 268,000 | 292,000 | 318,900 |

Source: 1/ Menkin, 1974

2/ Contra Costa County, 1973

TABLE 13

METROPOLITAN AND RURAL WASTE GENERATION FACTORS

| <u>Type Waste</u> | <u>Waste Generation Factor</u> | <u>% Increase Per Annum</u> |
|--|--|---------------------------------|
| Residential Refuse (metropolitan) | 2.4 lbs/capita/day (range 2.0-3.0 lbs.) | 1-2% ¹ |
| Residential Refuse (rural) | 1.7 lbs/capita/day (range 1.5-2.0 lbs.) | 2% |
| Commercial Refuse (metropolitan) | 2.8 lbs/capita/day (range 2.5-3.0 lbs.) (or 1 lb/square foot floor space/day) | |
| Commercial Refuse (rural) | 1.4 lbs/capita/day (range 1.0-1.6 lbs) | |
| Metropolitan residential and commercial combined rate | 4.9-5.7 lbs/capita/day ² | |
| City street refuse (leaves, litter, sweepings) | 40-180 lbs/capita/year | |
| Refuse from county and state roads | 3.3 - 8.0 tons/mile/year ³ | |
| Sewage treatment plant residues | 85 - 120 lbs/capita/year | |
| Demolition and Construction (metropolitan) | 500 - 700 lbs/capita/year | |
| Demolition and Construction (rural) | 100 - 200 lbs/capita/year | |

- 1) Some of the commenting agencies reported no significant increase in per capita generation for the past several years. This trend is borne out by recent State Department of Health estimates of solid waste disposed in 1973. However, for planning purposes, a moderate percentage increase should be allowed, particularly when estimating storage, transfer and disposal site needs.
- 2) Since collection of residential and commercial wastes is often combined, and records are reported for these combined wastes, this category was added to the list and could be used to estimate the amounts of non-industrial municipal refuse generated in an area.
- 3) The County of Los Angeles suggested a rate of 284 lbs/capita/year for city and county streets.

Source: SSWMB, July 1974

TABLE 14

SOLID WASTE DENSITIES

| Type Waste | Density (Pounds per cubic yard) | | |
|---|--------------------------------------|----------------------|-------------------------|
| | Storage | In Truck (compacted) | In Landfill (compacted) |
| Residential refuse | 120-170 (up to 250) ^{1/} | 350-650 | 600-1100 |
| Commercial refuse | 120-170 | 350-650 | 600-1100 |
| City street refuse (leaves, letter, sweepings) | 200 | 250-300 | 300-1200 |
| Sewage Treatment Residues | | - | 800-1600 (screened) |
| Demolition/Construction Mixed wood waste | | | 600-1000 |
| Concrete, brick, asphalt | | | 1500-2200 |

^{1/} Storage densities may vary with the type of collection service offered; once-per-week pick-up of one can will result in higher densities in the can than twice per-week or unlimited quantity service.

Source: SSWMB, July 1974

TABLE 15
CLIMATOLOGICAL DATA
RICHMOND, CALIFORNIA
1951-1960

| | Temperature (°F) | | | | | Precipitation (inches) |
|--------|---------------------|-----------------|-----------------|-----------------|--------|---------------------------|
| | Highest | Mean Maximum | Mean Monthly | Mean Minimum | Lowest | Total Monthly |
| Jan | 70 | 57.4 | 50.2 | 43.0 | 28 | 5.27 |
| Feb | 76 | 61.0 | 52.9 | 44.7 | 28 | 3.61 |
| Mar | 83 | 63.4 | 54.6 | 45.8 | 33 | 2.44 |
| Apr | 90 | 65.6 | 57.4 | 49.2 | 35 | 1.95 |
| May | 93 | 69.2 | 60.6 | 52.0 | 42 | .66 |
| Jun | 104 | 71.0 | 62.8 | 54.6 | 45 | .12 |
| Jul | 92 | 69.0 | 62.0 | 54.9 | 50 | T |
| Aug | 89 | 69.0 | 62.2 | 55.3 | 50 | .04 |
| Sep | 95 | 73.6 | 65.0 | 56.4 | 50 | .50 |
| Oct | 91 | 71.5 | 62.4 | 53.2 | 41 | .72 |
| Nov | 85 | 65.0 | 56.1 | 47.2 | 34 | 1.76 |
| Dec | 75 | 59.3 | 51.5 | 43.6 | 32 | 4.98 |
| Annual | 104 | 66.3 | 58.1 | 50.0 | 28 | 22.05 |

Source: JARA, 1974

TABLE 16

WEST CONTRA COSTA SANITARY LANDFILL DISPOSAL OPERATION EQUIPMENT

1. Richmond Sanitary Service:

| | | |
|-----|-------------------------------------|-----------------------------|
| ONE | 826-B Compactor Caterpillar Tractor | Integrated sprinkler system |
| ONE | D-6 Caterpillar Tractor | TWO pick-up trucks |
| ONE | large road grader | TWO dump trucks |
| ONE | hough pay loader | ONE fork lift truck |
| TWO | fire trucks | ONE drag line |
| ONE | 2500-gallon tanker | ONE jeep |
| TWO | auxiliary pumps | TWO 8-foot prams |

2. West Coast Salvage:

| | | |
|-----|-----------------|--------------------------------|
| ONE | box truck | ONE electric magnet (on order) |
| TWO | flat bed trucks | |

Source: Murdock, November 1974

TABLE 17

CHRONOLOGY OF KNOWN FIRES AT THE WEST CONTRA COSTA COUNTY DUMP

Location within dump designated as:

Debris Area (trash, garbage, etc.)

Chemicals Dump Area

Sludge Area (where sewage residue is deposited)

| | |
|---|--|
| 7/18/61 | 3 small fires plus 1 large fire in debris area and 1 large fire in chem. dump area |
| 7/23/62 | Chem. dump area |
| 8/19/63 | Debris area |
| 10/19/64 | Debris area |
| 7/23/66 | Debris area |
| *10/18/66 to 11/4/66 | 3 fires - area known within dump |
| ** S.P. Co. F. Prot. Dist. files show an additional 5 fires for 1966. | |
| ** S.P. Co. F. Prot. Dist. files show 8 fires in 1967. | |
| 4/26/68 | Debris area |
| *5/9/68 | Chem. dump area |
| ** S.P. Co. F. Prot. Dist. files show an additional 7 fires for 1968. | |
| 11/22/69 | Chem. dump area |
| 7/27/70 | Debris area |
| 9/2/71 | Debris area |
| 4/4/72 | Chem. dump area |
| 10/18/72 | Chem. dump area |
| *4/5/73 | Chem. dump area |
| 4/12/73 | Chem. dump area |

Table 17 cont.

| | | |
|----------|--------------------------|-----------|
| *5/5/73 | Debris area | |
| *6/8/73 | Area within dump unknown | |
| *6/16/73 | Area within dump unknown | |
| *8/10/73 | Debris area | |
| *8/15/73 | Garbage and debris area | |
| *8/16/73 | Debris area | |
| *8/17/73 | Debris area | |
| *8/20/73 | Fire of unknown type | |
| *8/22/73 | Debris area | |
| *8/23/73 | Debris area | 0338 hrs. |
| *8/23/73 | Debris area | 1554 hrs. |
| *8/24/73 | Debris area | |
| *8/31/73 | Sludge area | |
| *9/11/73 | Debris area | |
| *10/4/73 | Debris area | |

* Indicates "Alarms" on record with S.P. Fire Prot. Dist.

** Indicates totals supplied by S.P. Fire Prot. Dist.

Dates and times not supplied at time of inquiry.

Source: Donovan, 1974

TABLE 18

COMMON REACTIVE ORGANIC COMPOUNDS
USED BY BAY AREA INDUSTRIES1. General

| | |
|------------------------|---------------|
| gasoline | mesityl oxide |
| turpentine | isophorone |
| depentene | tolvene |
| alpha piene | xylols |
| cyclohexene | benzaldehyde |
| styrene | nitrobenzene |
| cis dichloroethylene | aniline |
| trans dichloroethylene | pyridine |
| chloroprene | ethylbenzene |
| allyl chloride | cumene |
| allyl alcohol | propylbenzene |
| benzyl alcohol | terpenes |
| vinyl ether | aldehydes |
| phthalates | furfural |
| solvent naphtha | acrylonitrile |

2. American mineral spirits

| | |
|----------------------------|-----------------|
| Amsco lactol spirits E1 | Amsco Solv C |
| Amsco Super Naphtholite W1 | Amsco Solv B-90 |
| Amsco mineral spirits | Amsco Solv B |
| Amsco 46 spirits | Amsco Solv D-80 |
| Amsco 460 solvent | Amsco Solv F-80 |
| Amsco Solv A | Amsco Solv D |
| Amsco Solv A-80 | Amsco Solv F |
| Amsco Solv C | Amsco Solv F-85 |
| | 1500 Solvent |

3. Atlantic Products

| | |
|------------|------------|
| Solvent 36 | Solvent 49 |
| Solvent 38 | Solvent 52 |
| Solvent 60 | Solvent 57 |
| Solvent 46 | Solvent 53 |
| Solvent 45 | Solvent 58 |
| Solvent 62 | |

Table 18 cont.

4. Chevron Products

Chevron Stoddard 60R8028
Chevron solvent 372
Chevron solvent 350

Chevron thinner 265
Chevron thinner 410

5. Central Solvent Products

Thinner 292
Mineral spirits
Solvent T
Solvent No. 30

Solvent No. 27
Solvent No. 35
Solvent No. 18
Solvent No. 45

6. Skelly Products

Skellysolve B

7. Shell Products

Shell TS 28

Shell paint base spirit

8. Sears Products

Tripolene

9. Standard Products

Standard odorless thinner
(60R8028)
Standard thinner 250
Standard thinner 265

Standard thinner 350
Standard thinner 410
Mineral spirits

10. Dupont Products

Lacquer thinner 3661

Lacquer thinner 3608

11. Exxon Products (Esso-Enco)

VMP naphtha
Laktane
Socal 36L
Socal 37
Socal 40L
Socal 44L
Socal 51L
Socal 52L
Socal 53L
Socal 54L
Socal 92L
Socal 93L

Socal 97A
Socal 97B
Socal 97L type III
Socal 98L
Socal 1
Socal 2
Socal 3
Socal 25
Socal 26
Socal 28
Socal 29
Socal 35

Table 18 cont.

| | |
|----------------|------------|
| SOHIO | Socal 230L |
| SE thinner 225 | Socal 266L |
| DC naphtha | Socal 269L |
| Socal 170L (E) | Socal 305L |
| Socal 170L (R) | Socal 306L |
| Socal 171L | Socal 356L |
| Socal 175L | Socal 355L |
| Socal 202L | Socal 360L |

12. Signal Oil Co.

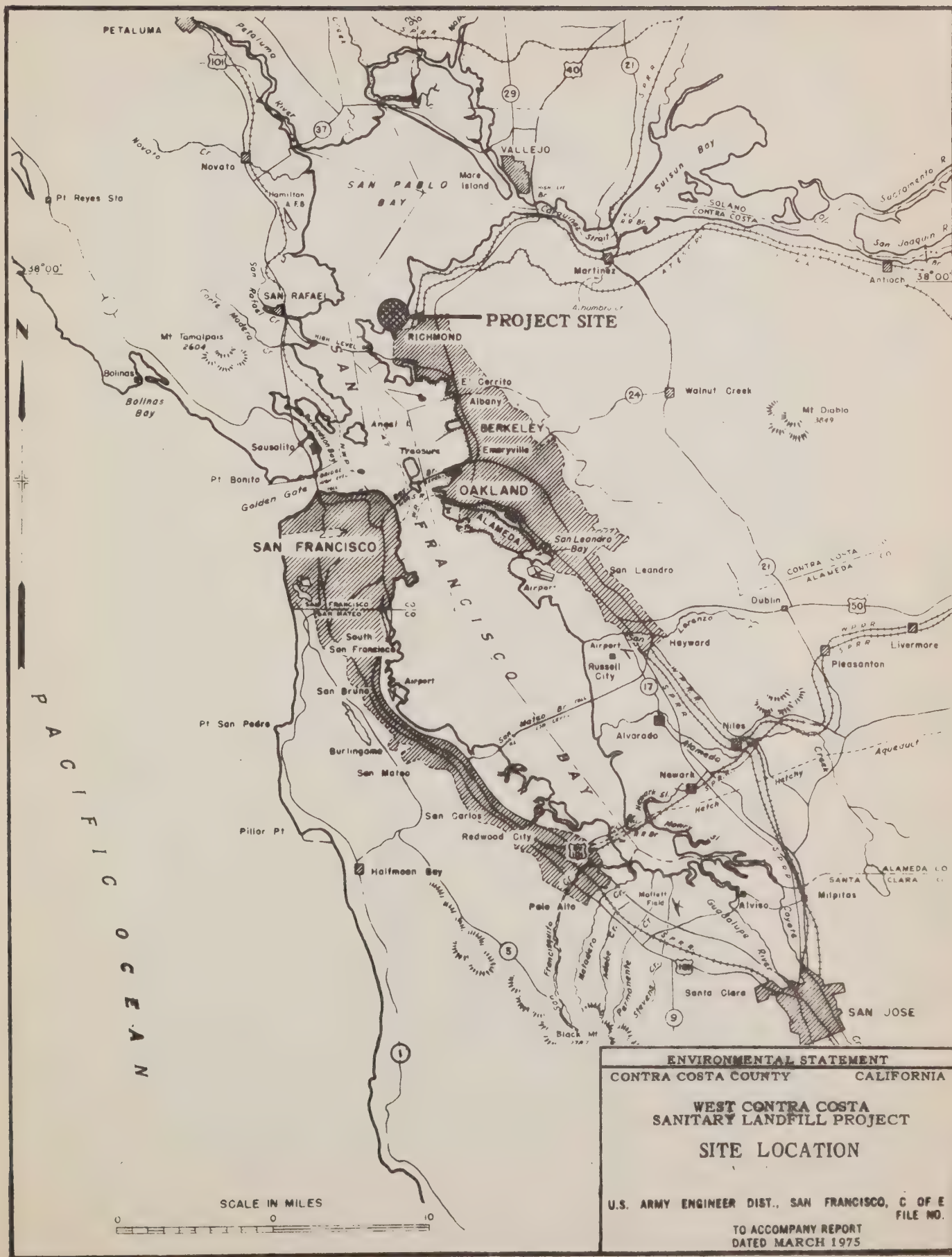
| | |
|-----------------|--------------|
| Espesol No. 1 | Espesol 1300 |
| Espesol No. 2 | Espesol 2350 |
| Espesol No. 5 | Espesol 5300 |
| Espesol No. 5 x | |

13. Sinclair Products

| | |
|-----------------|----------------|
| Mineral spirits | Solvent No. 30 |
| Solvent T | |

Source: Donovan, 1974

PLATES



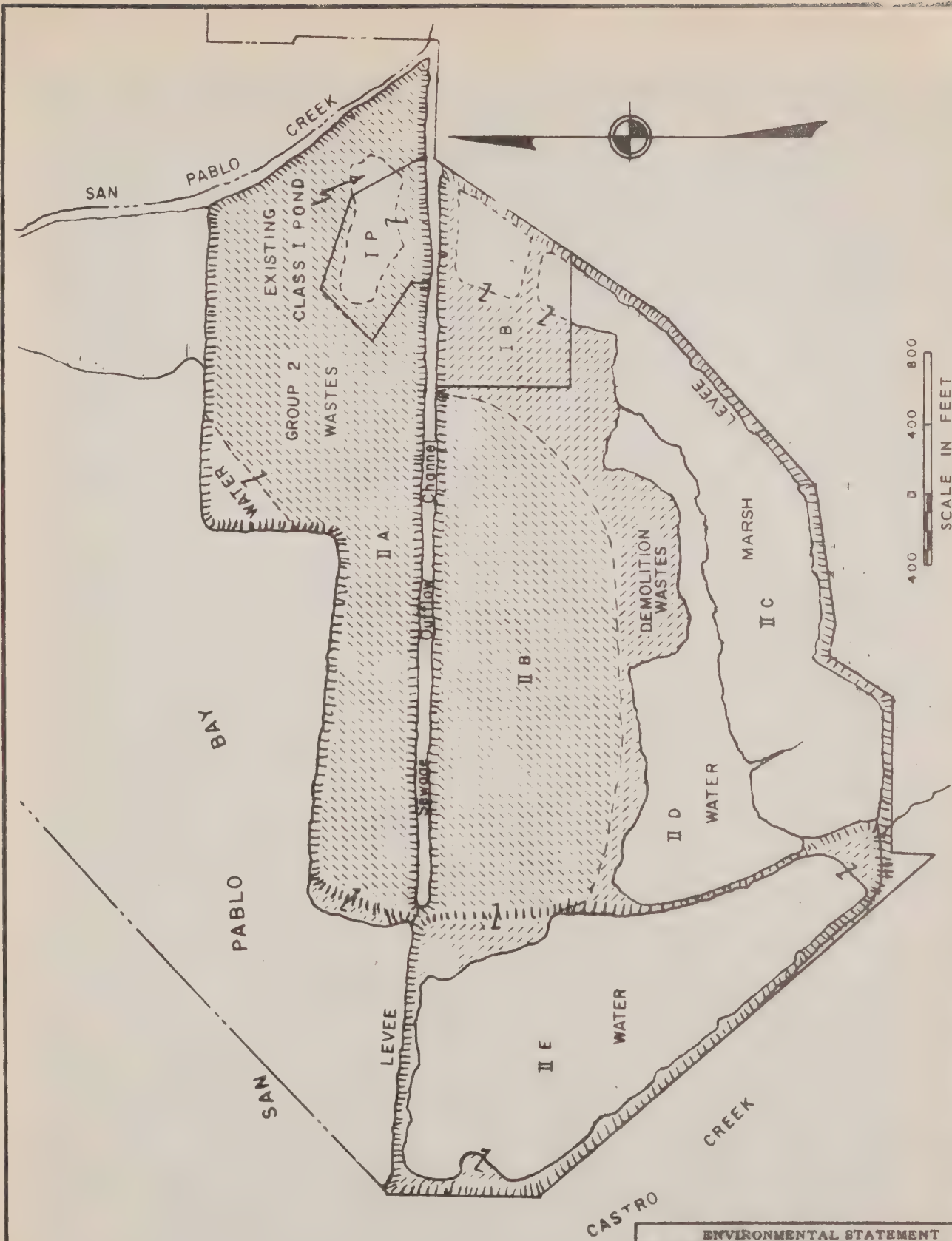
ENVIRONMENTAL STATEMENT
CONTRA COSTA COUNTY CALIFORNIA

WEST CONTRA COSTA
SANITARY LANDFILL PROJECT

SITE LOCATION

U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C OF E
FILE NO.

TO ACCOMPANY REPORT
DATED MARCH 1975



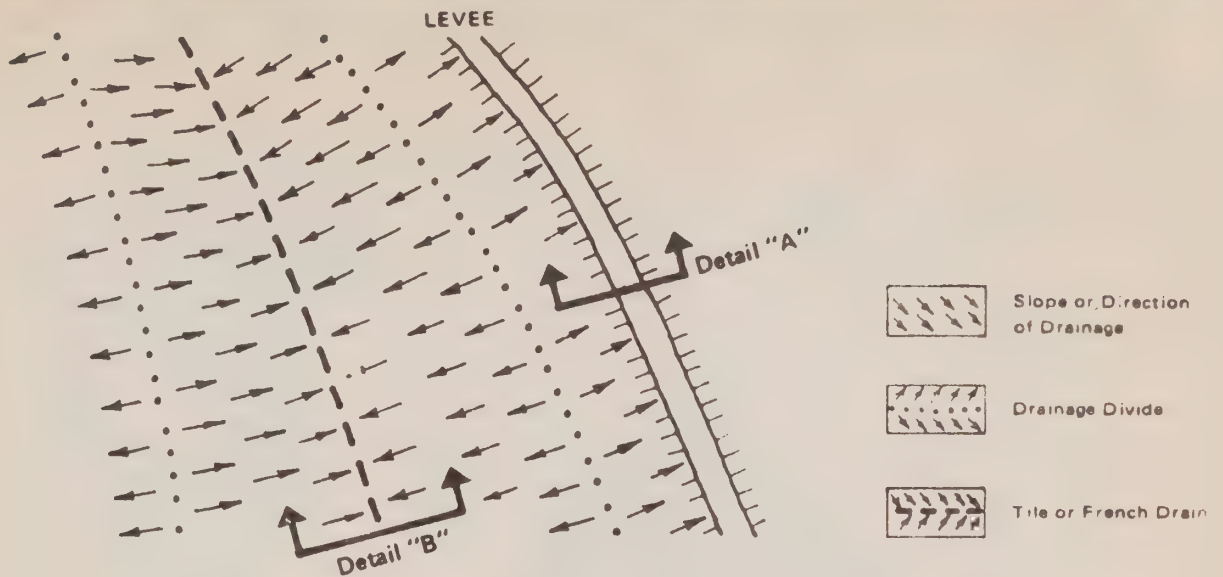
SOURCE: Modified from
ENVIRONMENTAL ASSESSMENT ENGINEERING

| | |
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| ENVIRONMENTAL STATEMENT | |
| CONTRA COSTA COUNTY | CALIFORNIA |
| WEST CONTRA COSTA SANITARY LANDFILL PROJECT | |
| PROJECT SITE | |
| U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C OF E FILE NO. | |
| TO ACCOMPANY REPORT DATED: MARCH 1975 | 9-34-3 |

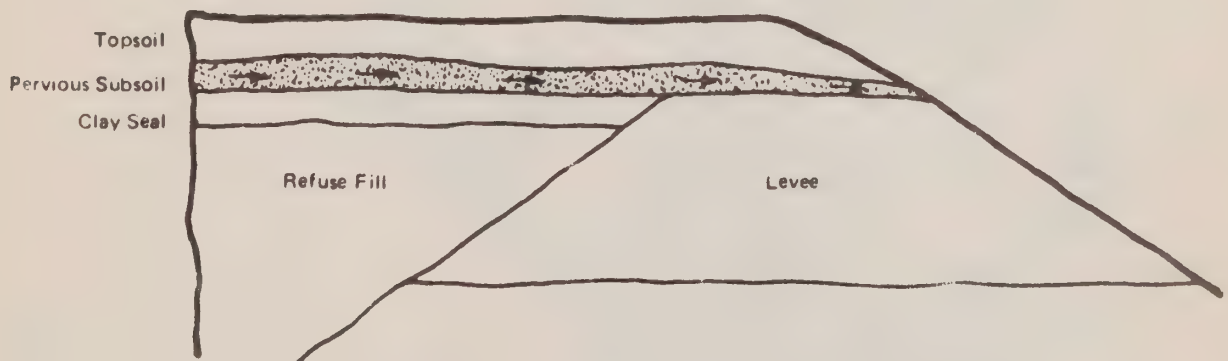


PLATE 3

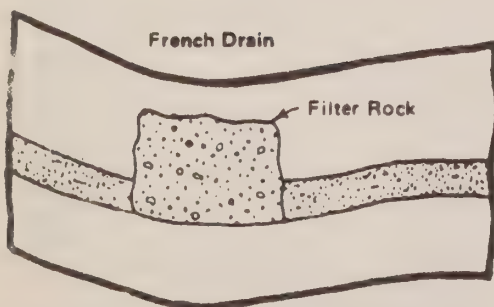
Richmond Sanitary Landfill
Photo taken 18 APR 68



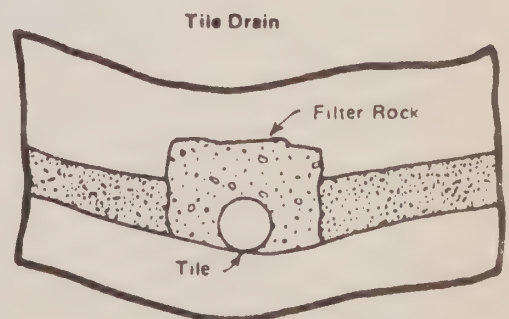
TYPICAL DRAINAGE PATTERN



Detail "A" — Subsoil Drainage at Levees



(Filter Rock may be continuous to the surface in either case.)



Detail "B" — Tile or Filter Rock Drains

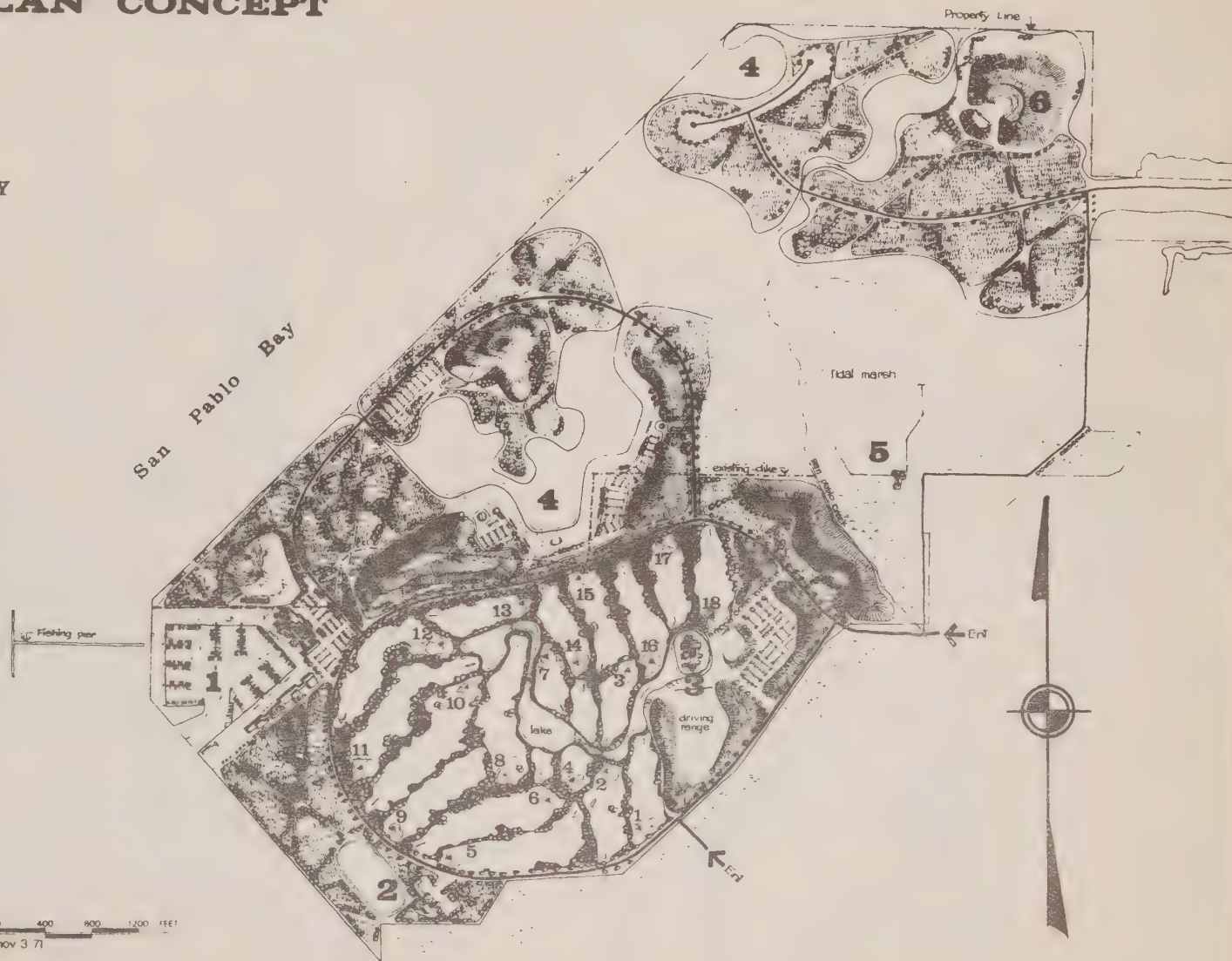
ENVIRONMENTAL STATEMENT
CONTRA COSTA COUNTY CALIFORNIA
WEST CONTRA COSTA
SANITARY LANDFILL PROJECT
DRAINAGE FROM FILL COVERS

U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C OF E
FILE NO.

TO ACCOMPANY REPORT
DATED MARCH 1975

SAN PABLO BAY REGIONAL PARK DEVELOPMENT PLAN CONCEPT

- 1 MARINA
- 2 EQUESTRIAN CENTER
- 3 GOLF COURSE
- 4 SWIMMING BEACHES
- 5 OUTDOOR EDUCATION FACILITY
- 6 OUTDOOR BOWL



SOURCE: Modified from
HERMAN D. RUTH & ASSOC. 1971

ENVIRONMENTAL STATEMENT

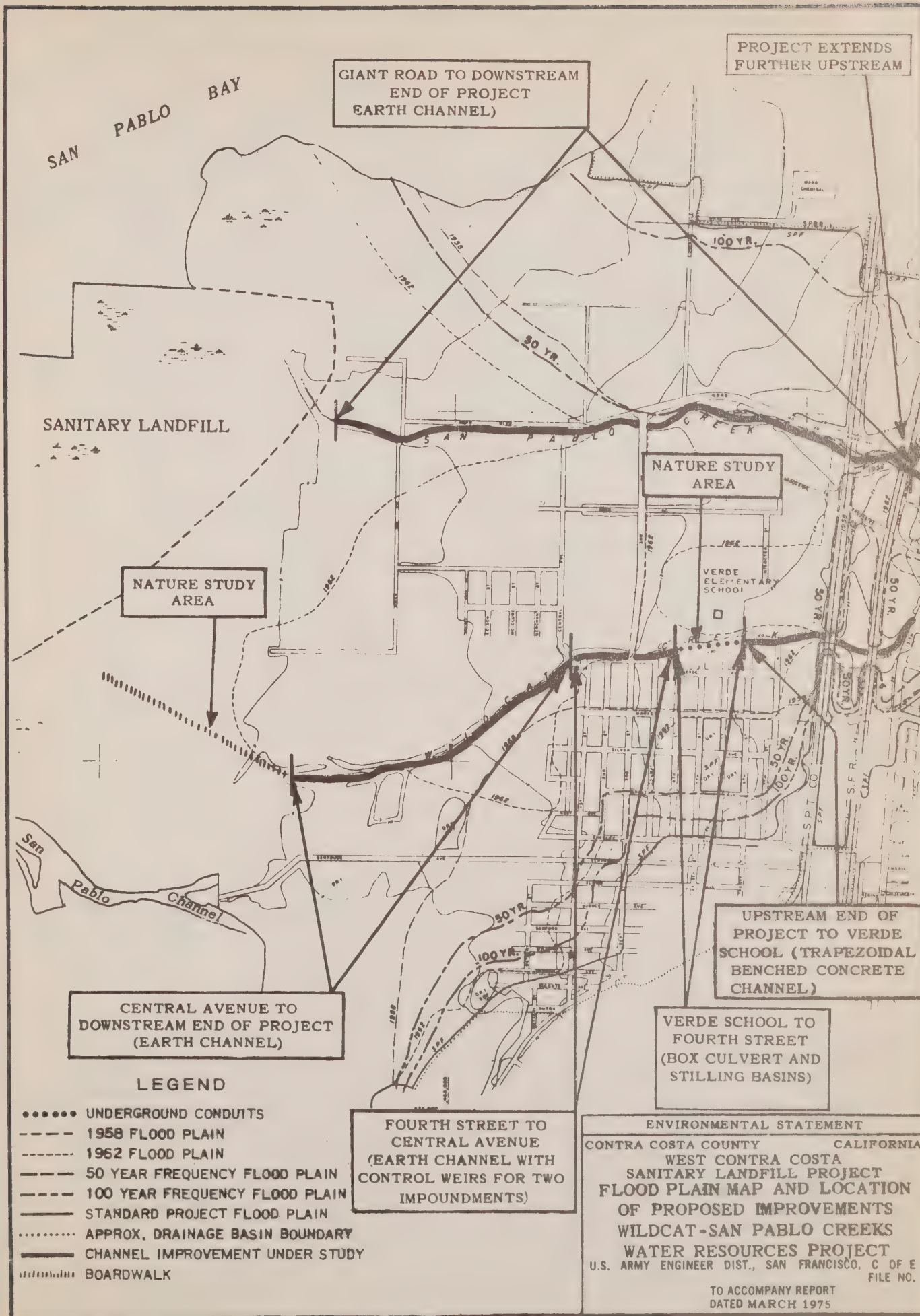
CONTRA COSTA COUNTY

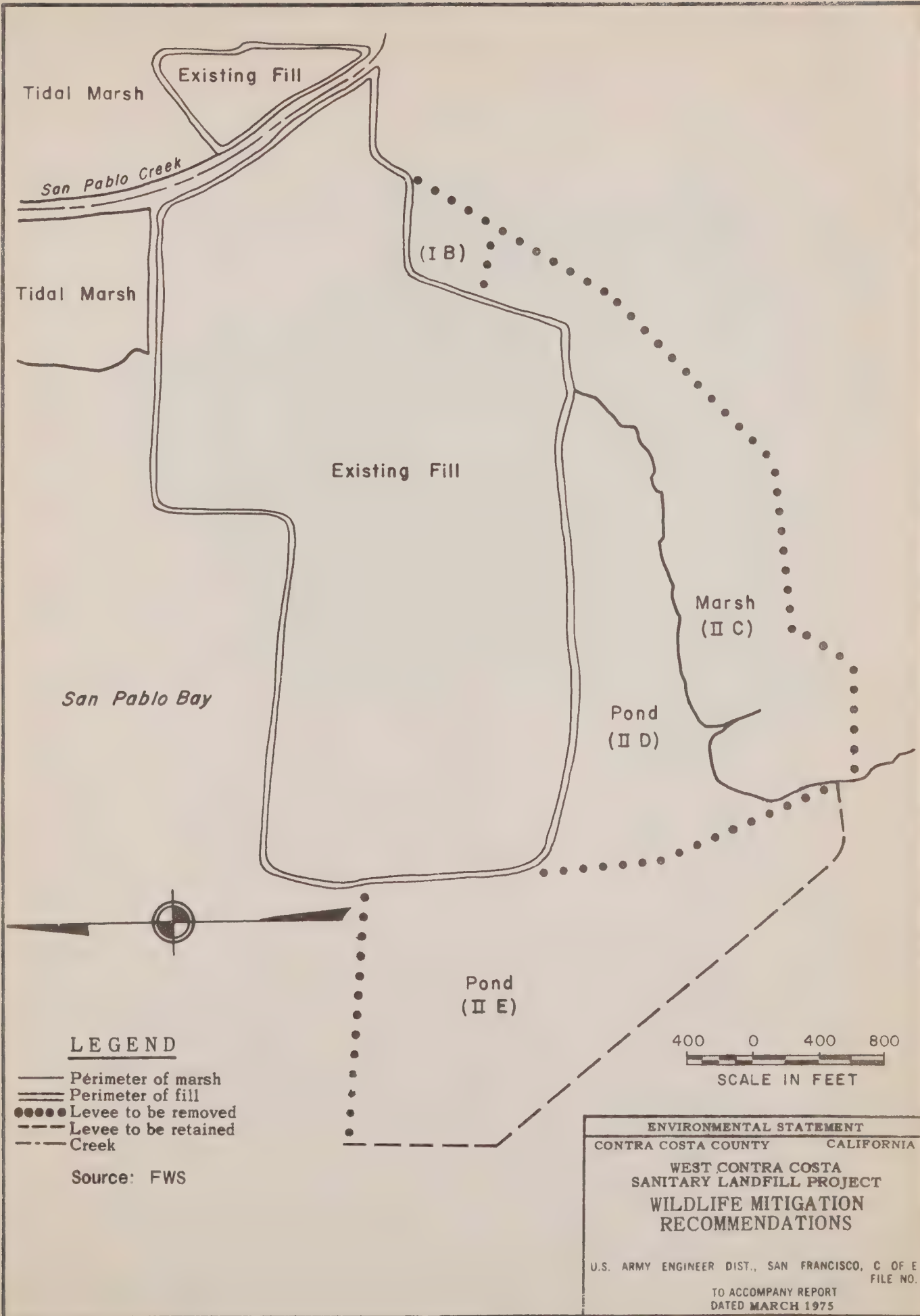
CALIFORNIA

WEST CONTRA COSTA
SANITARY LANDFILL PROJECT

PROPOSED PLAN

U.S. ARMY ENGINEER DIST., SAN FRANCISCO, CALIF. OF E
TO ACCOMPANY EIS
DATED: MARCH 1975
9-34-3





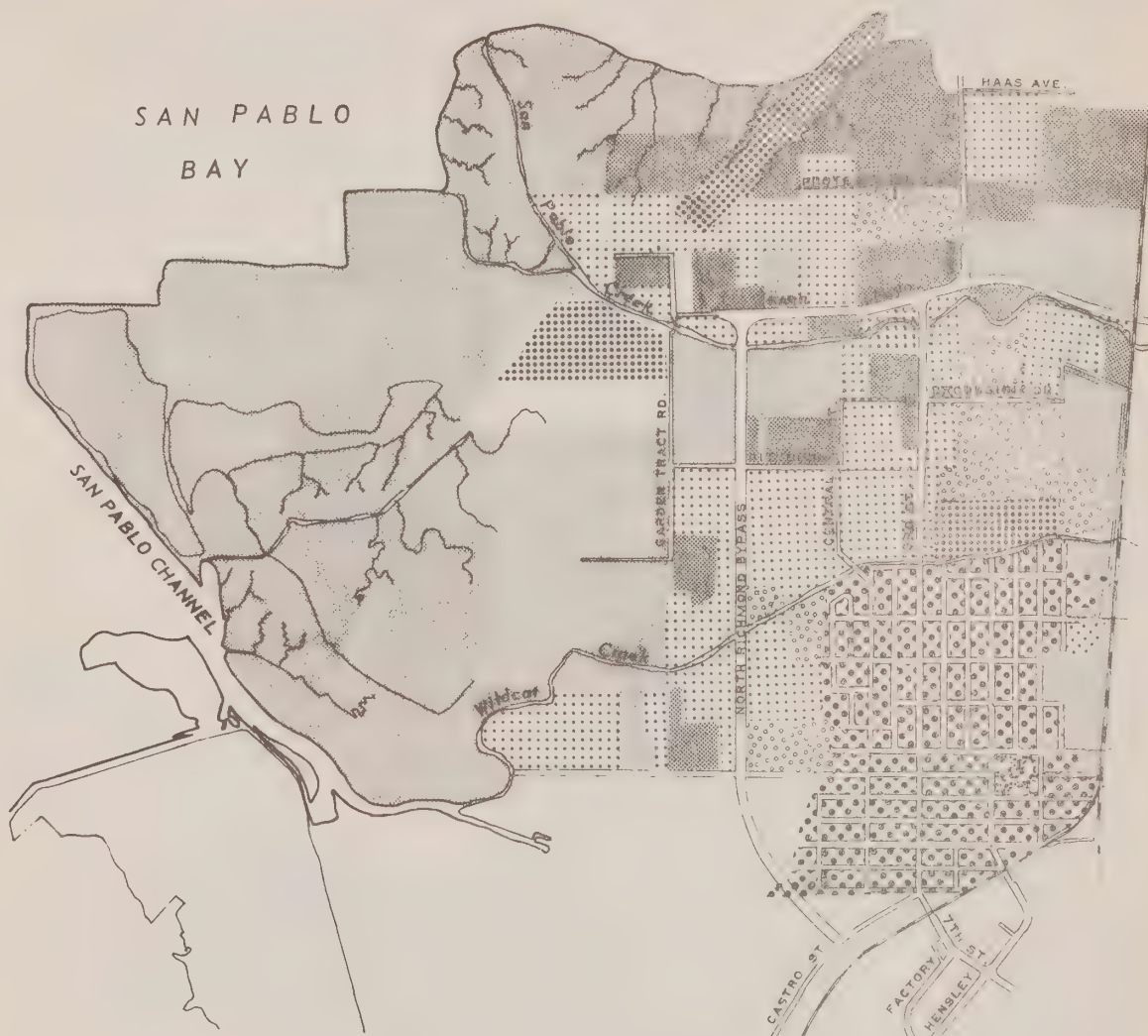
LEGEND

- Perimeter of marsh
- == Perimeter of fill
- Levee to be removed
- - - Levee to be retained
- - - Creek








Source: FWS

400 0 400 800
SCALE IN FEET

ENVIRONMENTAL STATEMENT
CONTRA COSTA COUNTY CALIFORNIA
WEST CONTRA COSTA
SANITARY LANDFILL PROJECT
WILDLIFE MITIGATION
RECOMMENDATIONS
U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C OF E
FILE NO.
TO ACCOMPANY REPORT
DATED MARCH 1975



LEGEND

-  VACANT
-  RESIDENTIAL
-  INSTITUTIONAL
-  NURSERIES
-  LIGHT INDUSTRIAL
-  HEAVY INDUSTRIAL
-  PARK

SOURCE: Contra Costa County Planning Department, 1971

ENVIRONMENTAL STATEMENT
CONTRA COSTA COUNTY CALIFORNIA

WEST CONTRA COSTA
SANITARY LANDFILL PROJECT

EXISTING LAND USE

U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C. OF E.
FILE NO.

TO ACCOMPANY REPORT
DATED: MARCH 1975

REFERENCE USGS QUADS:

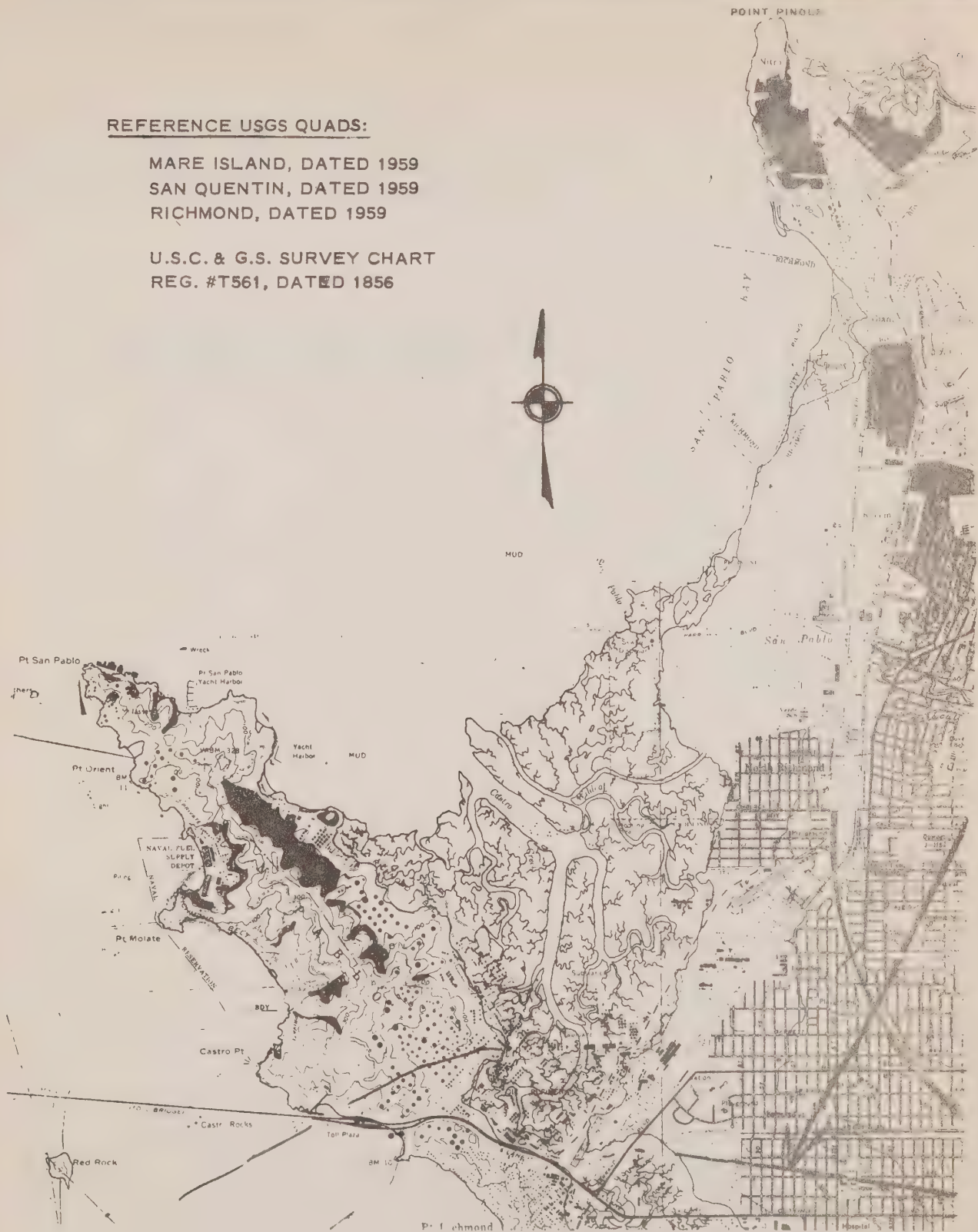
MARE ISLAND, DATED 1959

SAN QUENTIN, DATED 1959

RICHMOND, DATED 1959

U.S.C. & G.S. SURVEY CHART

REG. #T561, DATED 1856



ENVIRONMENTAL STATEMENT

CONTRA COSTA COUNTY CALIFORNIA

WEST CONTRA COSTA
SANITARY LANDFILL PROJECT
HISTORIC MARGINS
OF MARSHLAND
RICHMOND, SAN PABLO BAY

U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C OF E
FILE NO.

TO ACCOMPANY REPORT
DATED MARCH 1975

THIS MAP ENLARGED FROM U.S. GEOLOGICAL
SURVEY 7.5 MINUTE QUADRANGLES, 1947 SAN
QUENTIN, CALIF. AND 1959 RICHMOND, CALIF.

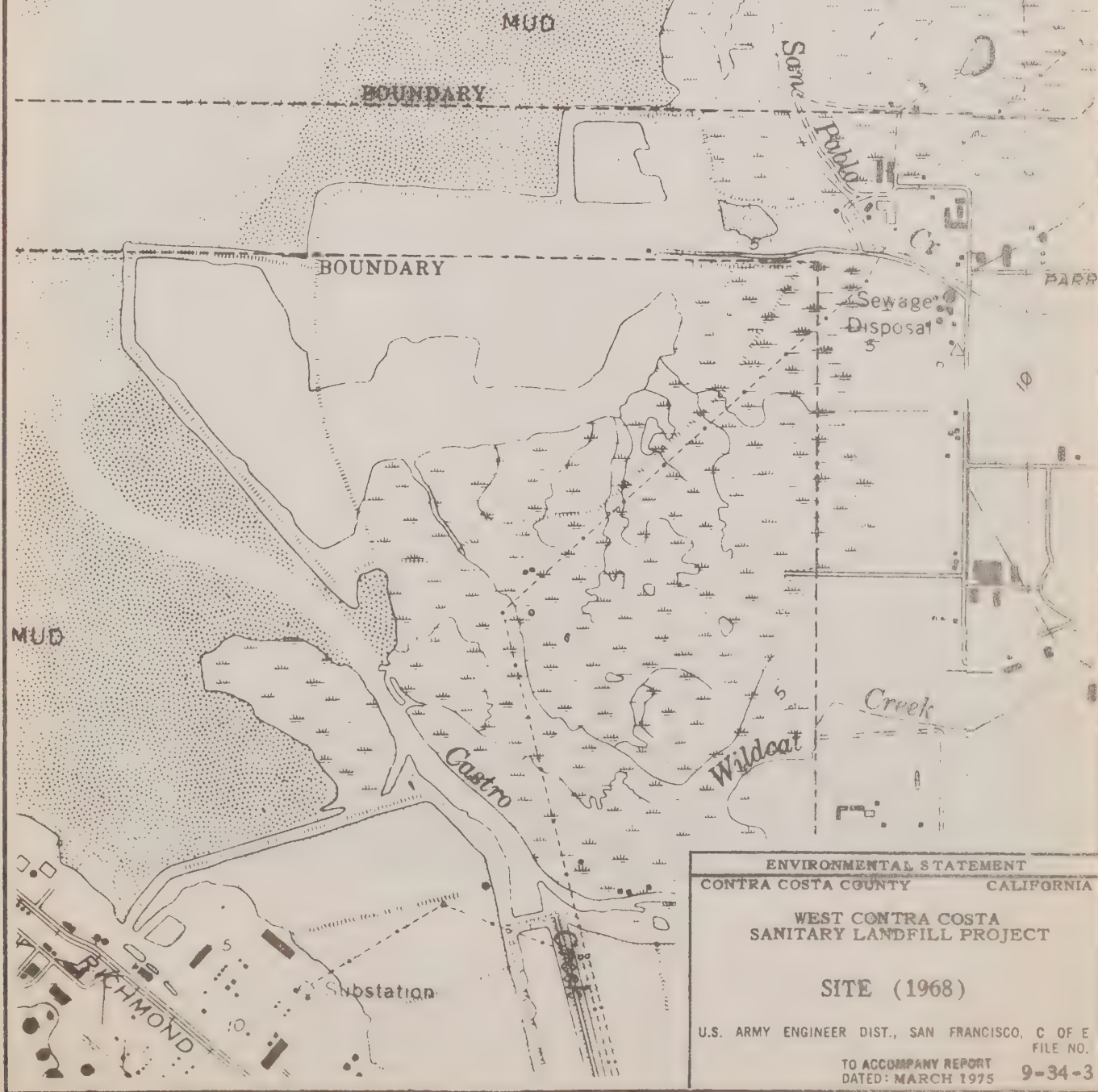
1000 0 1000 2000
SCALE IN FEET



ENVIRONMENTAL STATEMENT
CONTRA COSTA COUNTY CALIFORNIA
WEST CONTRA COSTA
SANITARY LANDFILL PROJECT
SITE (1947)
U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C OF E
FILE NO.
TO ACCOMPANY E.I.S.
DATED: MARCH 1975 9-34-3

THIS MAP ENLARGED FROM U.S. GEOLOGICAL
SURVEY 7.5 MINUTE QUADRANGLES, 1968 SAN
QUENTIN, CALIF. AND 1968 RICHMOND, CALIF.

1000 0 1000 2000
SCALE IN FEET



ENVIRONMENTAL STATEMENT
CONTRA COSTA COUNTY CALIFORNIA

WEST CONTRA COSTA
SANITARY LANDFILL PROJECT

SITE (1968)

U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C OF E
FILE NO.

TO ACCOMPANY REPORT
DATED: MARCH 1975 9-34-3



PLATE 12

Richmond Sanitary Landfill
Area IIE (foreground), Area IID (background),
Drainage channel (left)
Photo taken 29 NOV 71 looking NW

PLATE 13

Richmond Sanitary Landfill

Class II Areas

Photo taken 29 NOV 71 looking S

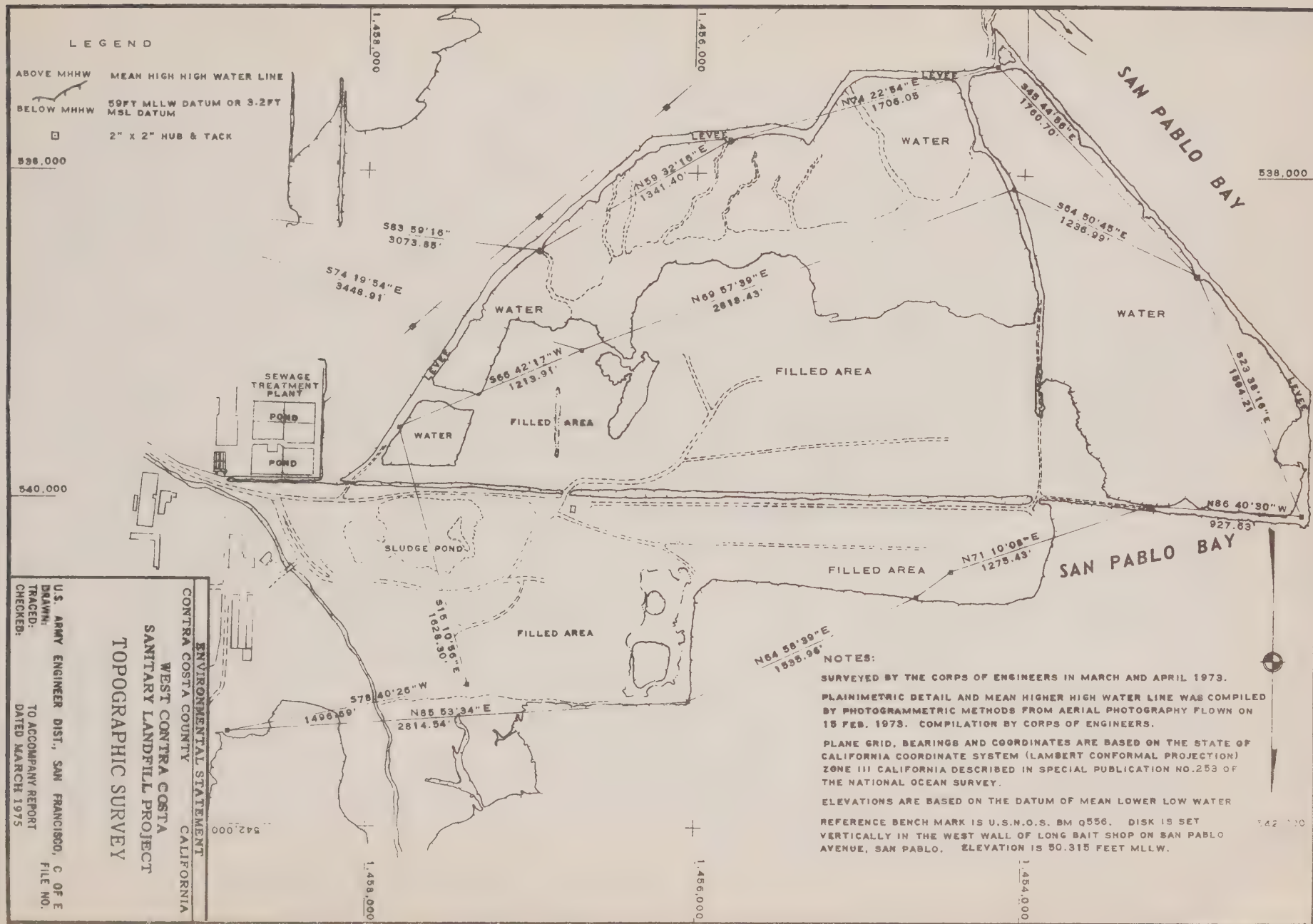


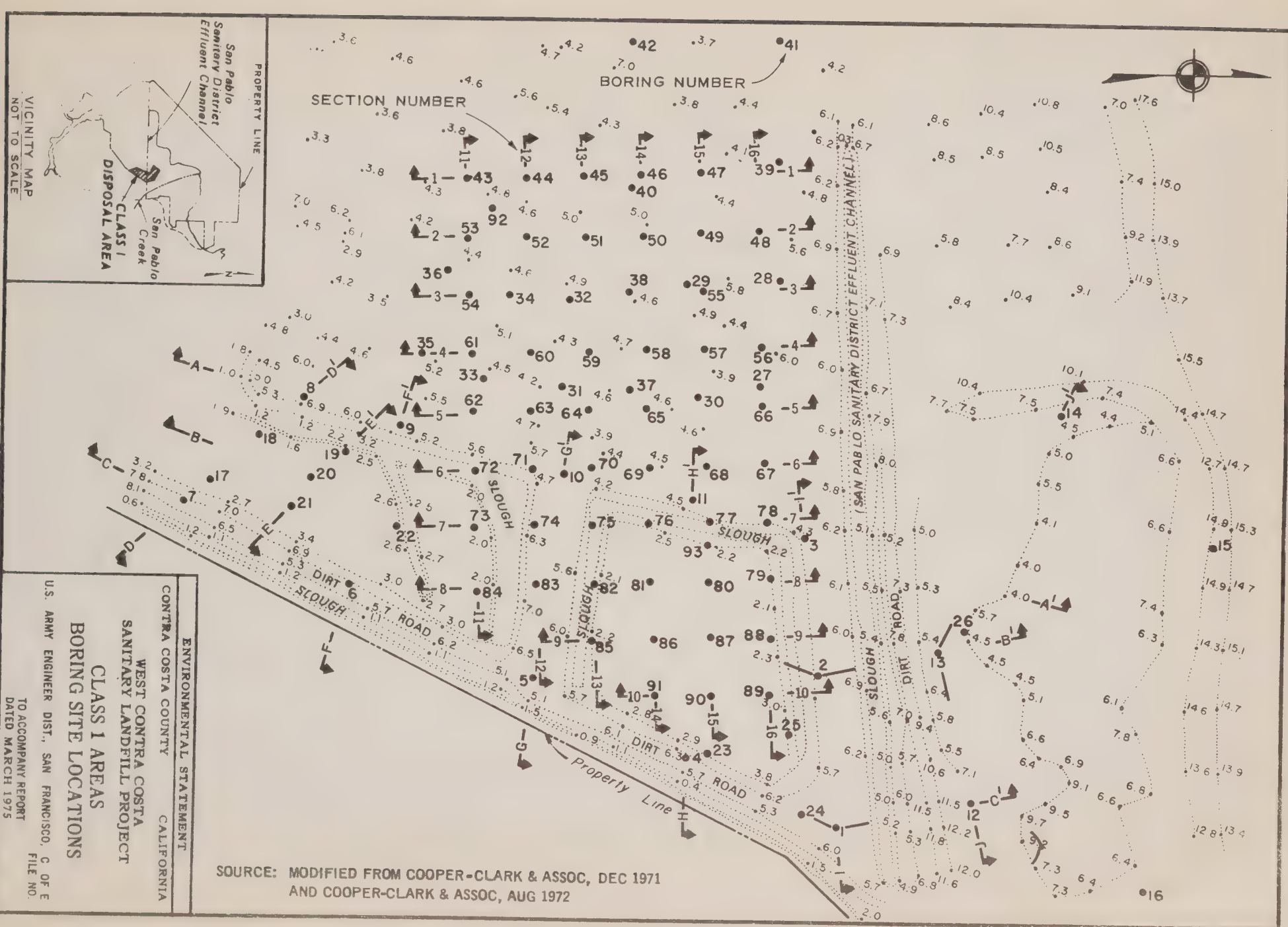
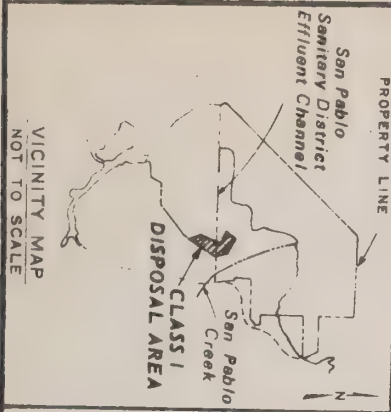
PLATE 14

Richmond Sanitary Service

Class I Areas

Photo taken 6 APR 72 looking W





LEGEND TO ACCOMPANY PLATES 17B - 17D



BAY MUD FILL



CHEMICAL WASTE



REFUSE FILL



CLAYEY SILT



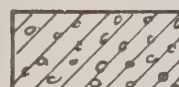
BAY MUD



BAY MUD CONTAINING SOME SAND
OR SAND LENSES



SILTY SAND



CLAYEY GRAVEL



SANDY CLAY

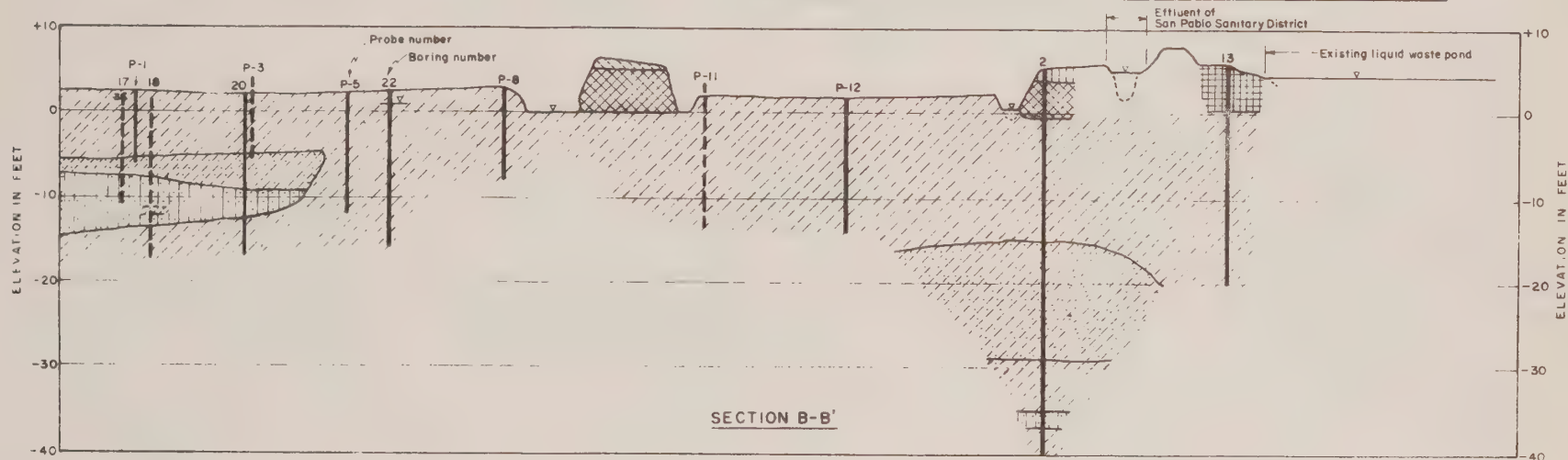
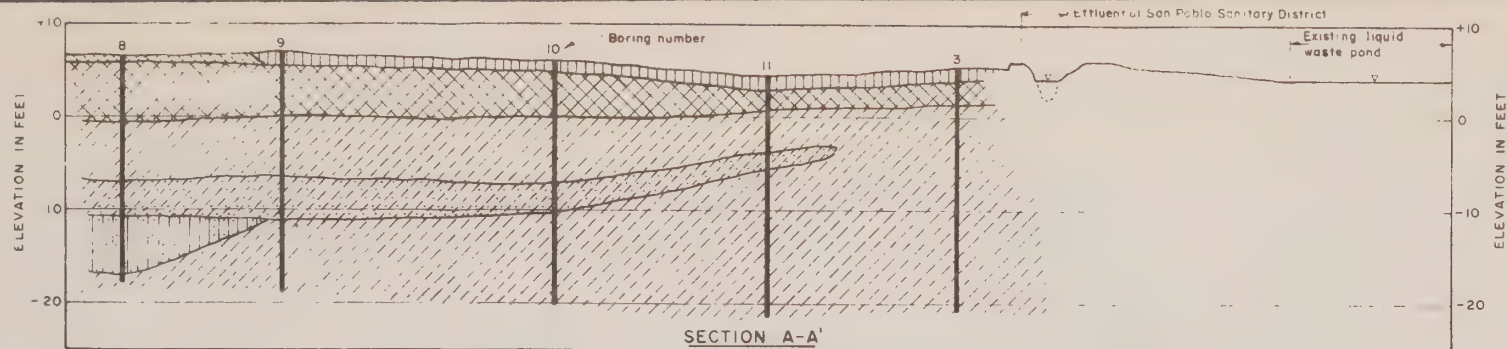


WATER ENCOUNTERED

NOTE: THE SUBSURFACE SECTIONS WERE DEVELOPED ON A BASIS OF WIDELY SPACED BORINGS. THEREFORE, VARIATIONS IN ACTUAL CONDITIONS FROM THOSE SHOWN SHOULD BE ANTICIPATED.

SOURCE: MODIFIED FROM COOPER-CLARK & ASSOC. DEC 1971

| | |
|---|------------|
| ENVIRONMENTAL STATEMENT | |
| CONTRA COSTA COUNTY | CALIFORNIA |
| WEST CONTRA COSTA SANITARY LANDFILL PROJECT | |
| CLASS 1 AREAS SUBSURFACE SECTIONS | |
| U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C OF E FILE NO. | |
| TO ACCOMPANY REPORT DATED MARCH 1975 | |



ENVIRONMENTAL STATEMENT

CONTRA COSTA COUNTY CALIFORNIA

WEST CONTRA COSTA
SANITARY LANDFILL PROJECT

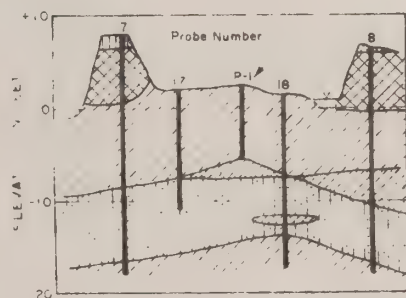
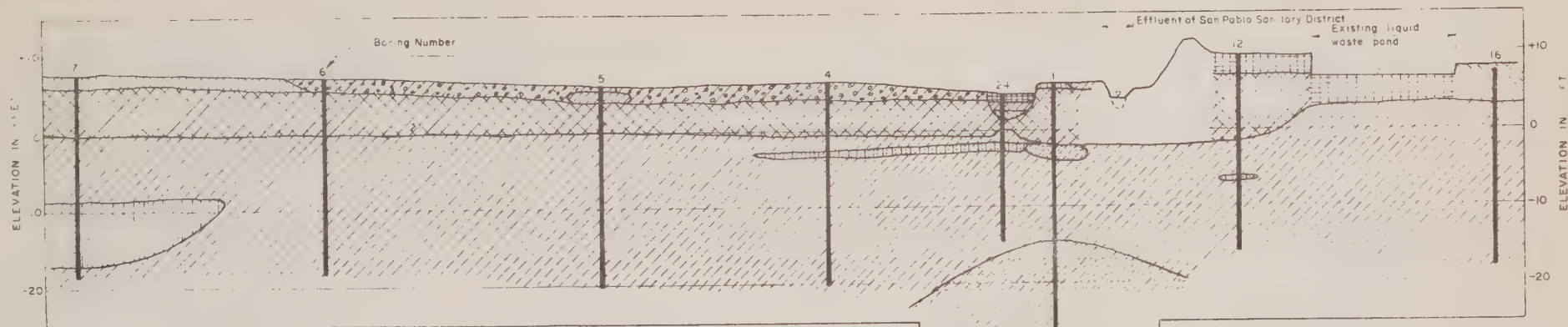
CLASS 1 AREAS

SUBSURFACE SECTIONS

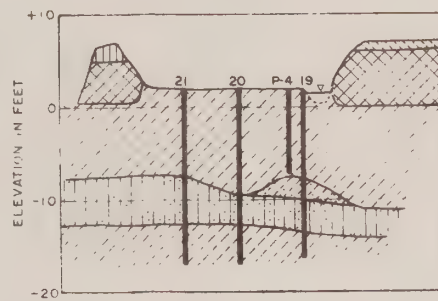
U.S. ARMY ENGINEER DIST., SAN FRANCISCO, CALIF. OF E
TO ACCOMPANY REPORT
DATED MARCH 1975
FILE NO.

NOTE: HORIZONTAL SCALE IS TEN TIMES VERTICAL SCALE

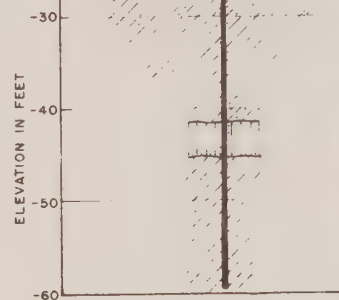
SOURCE: MODIFIED FROM COOPER-CLARK & ASSOC, DEC 1971



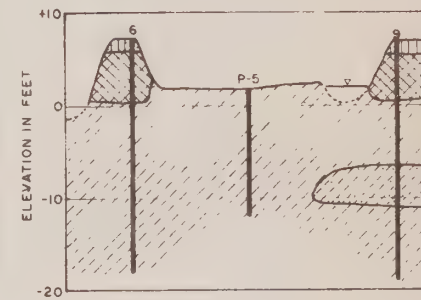
SECTION D-D'



SECTION E-E'



SECTION C-C'



SECTION F-F'

NOTE: HORIZONTAL SCALE IS TEN TIMES VERTICAL SCALE
 SOURCE: MODIFIED FROM COOPER-CLARK & ASSOC, DEC 1971

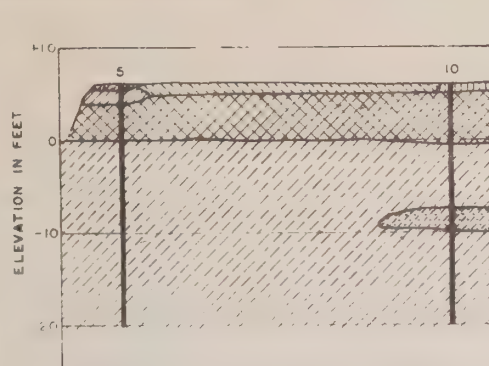
ENVIRONMENTAL STATEMENT

CONTRA COSTA COUNTY CALIFORNIA

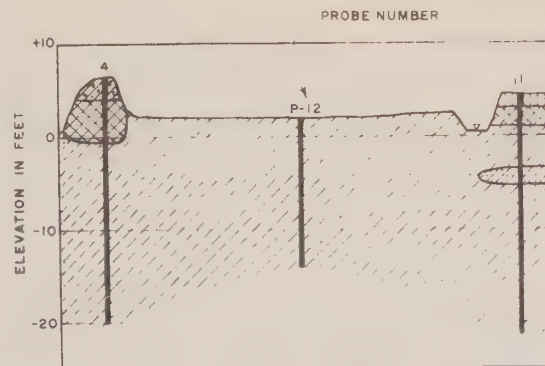
WEST CONTRA COSTA
 SANITARY LANDFILL PROJECT

CLASS 1 AREAS
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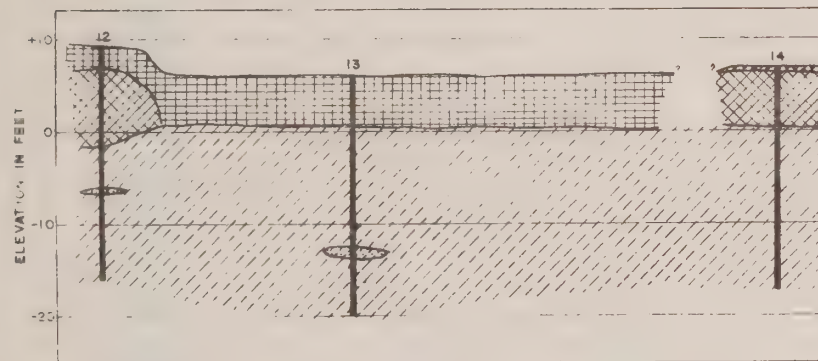
U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C OF E
 TO ACCOMPANY REPORT
 DATED MARCH 1975
 FILE NO.



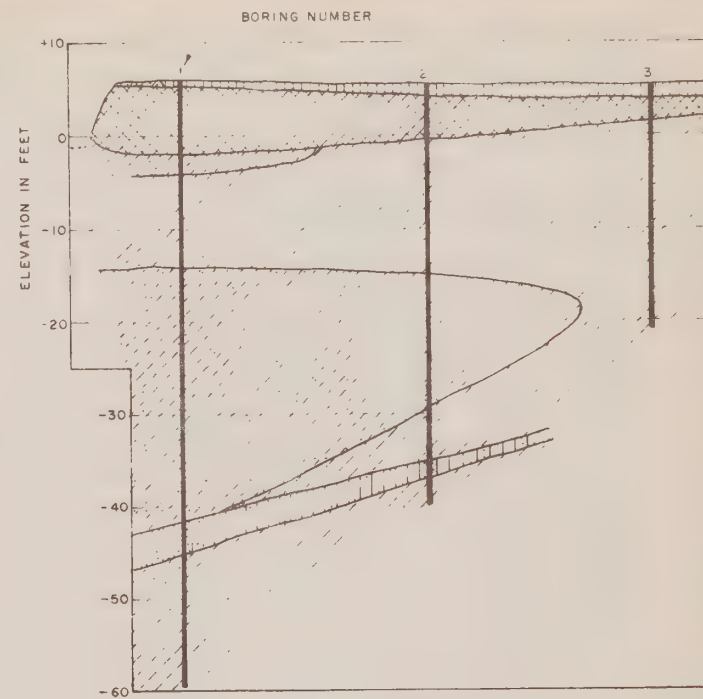
SECTION G-G'



SECTION H-H'



SECTION J-J'



SECTION I-I'

NOTE: HORIZONTAL SCALE IS TEN TIMES VERTICAL SCALE

SOURCE: MODIFIED FROM COOPER-CLARK & ASSOC, DEC 1971

ENVIRONMENTAL STATEMENT

CONTRA COSTA COUNTY CALIFORNIA

WEST CONTRA COSTA
SANITARY LANDFILL PROJECT

CLASS 1 AREAS
SUBSURFACE SECTIONS

U.S. ARMY ENGINEER DIST., SAN FRANCISCO, CALIF. FILE NO.

TO ACCOMPANY REPORT
DATED MARCH 1975

LEGEND TO ACCOMPANY PLATES 17 F — 17 J



Debris and garbage



Bay mud and bay mud fill (OH)



Sand (SP)



Silty sand and clayey sand (SM-SC)



Silt and sandy silt (ML)



Sandy clay (CL)



Silty clay (CL)

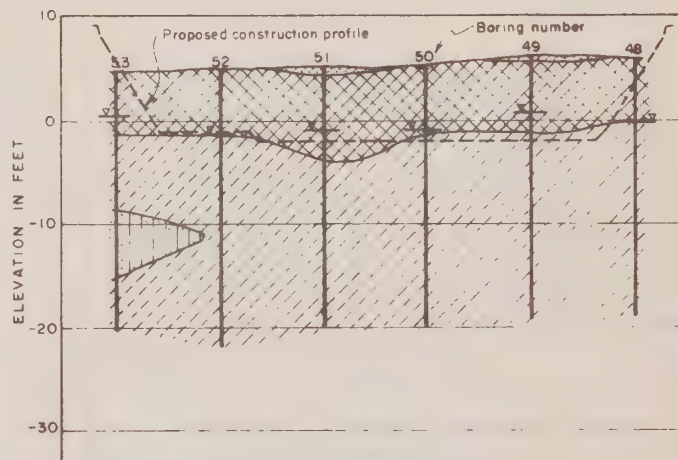


Water encountered

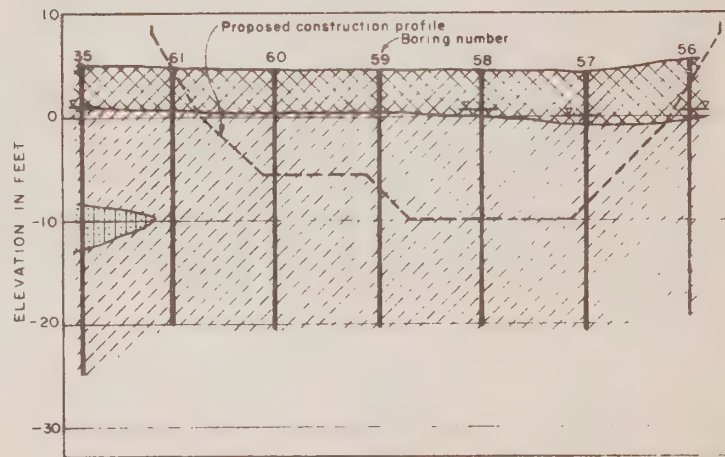
NOTE: THE SUBSURFACE SECTIONS WERE DEVELOPED ON A BASIS OF WIDELY SPACED BORINGS. THEREFORE, VARIATIONS IN ACTUAL CONDITIONS FROM THOSE SHOWN SHOULD BE ANTICIPATED.

SOURCE: MODIFIED FROM COOPER-CLARK & ASSOC, AUG 1972

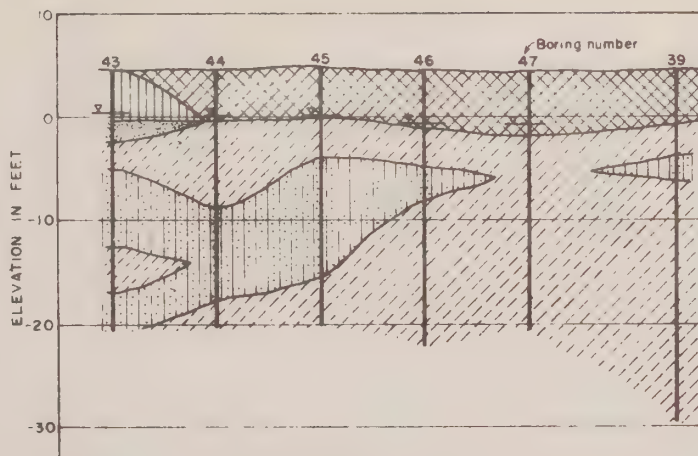
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| U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C OF E FILE NO. | |
| TO ACCOMPANY REPORT DATED MARCH 1975 | |



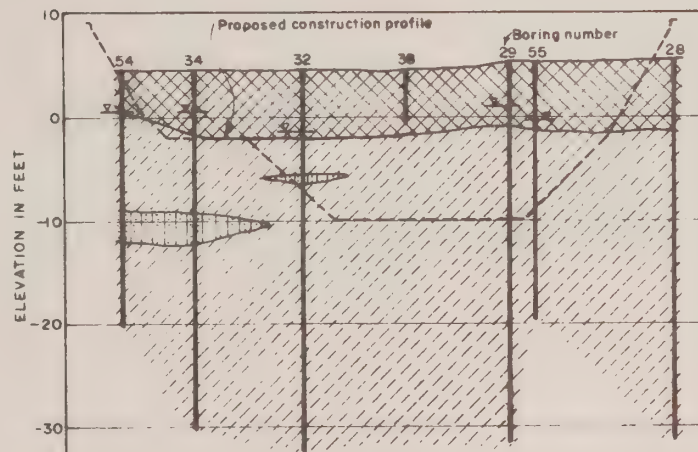
SECTION 2



SECTION 4



SECTION 1

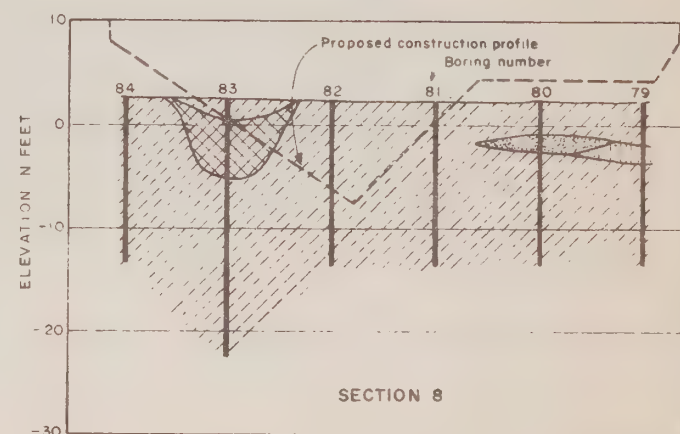
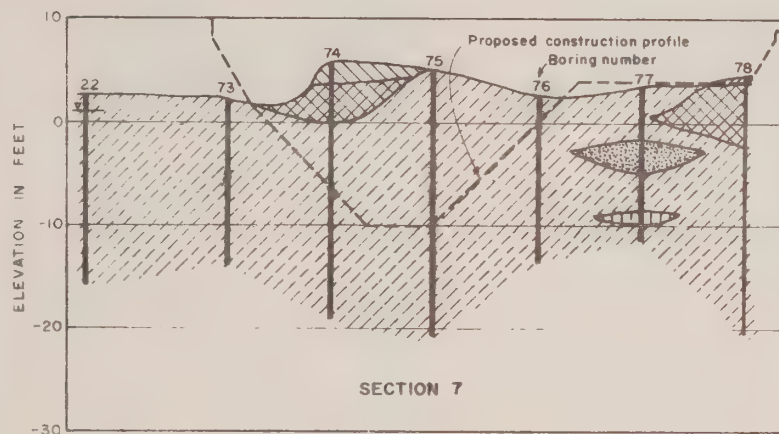
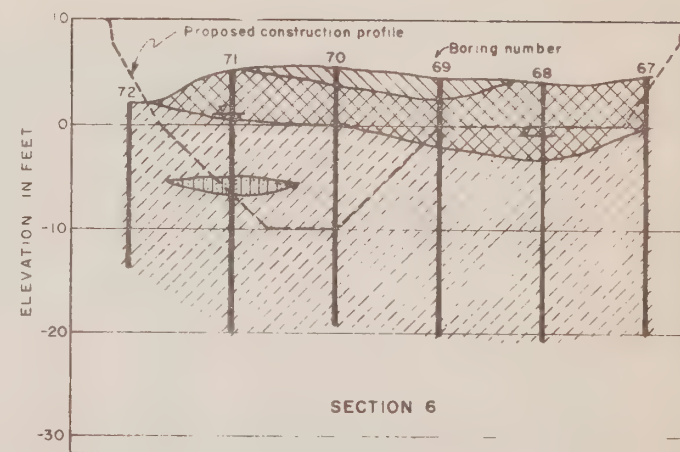
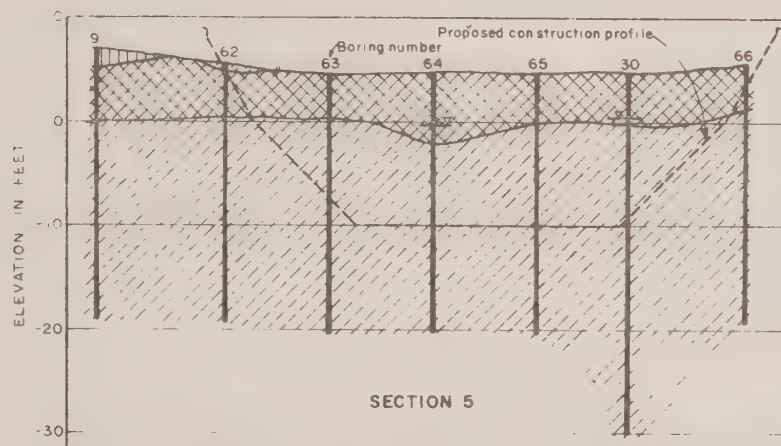


SECTION 3

NOTE: HORIZONTAL SCALE IS TEN TIMES VERTICAL SCALE
SOURCE: MODIFIED FROM COOPER-CLARK & ASSOC, AUG 1972

ENVIRONMENTAL STATEMENT
CONTRA COSTA COUNTY CALIFORNIA
WEST CONTRA COSTA
SANITARY LANDFILL PROJECT
CLASS 1 AREAS
SUBSURFACE SECTIONS

U.S. ARMY ENGINEER DIST., SAN FRANCISCO, CALIF. E
TO ACCOMPANY REPORT
DATED MARCH 1975
FILE NO.



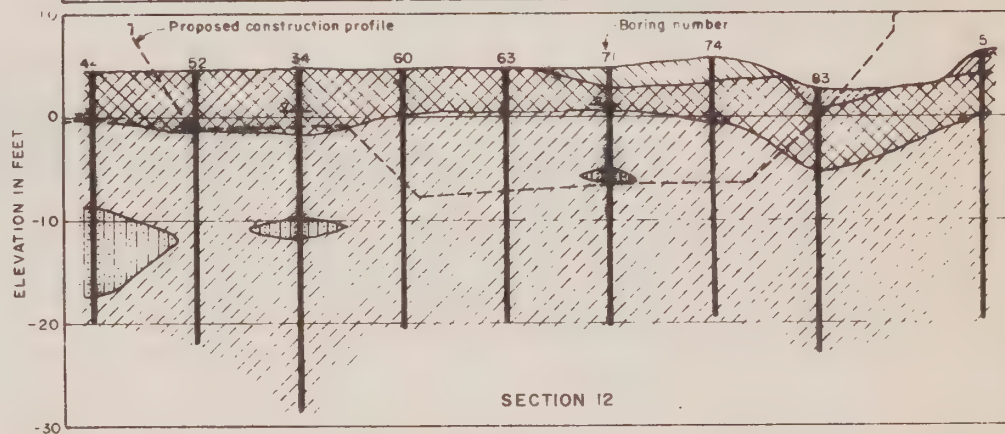
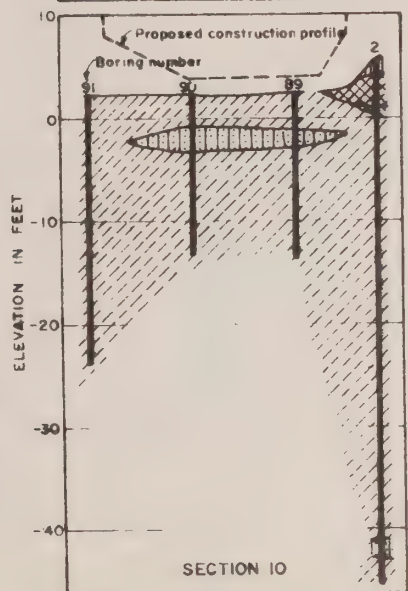
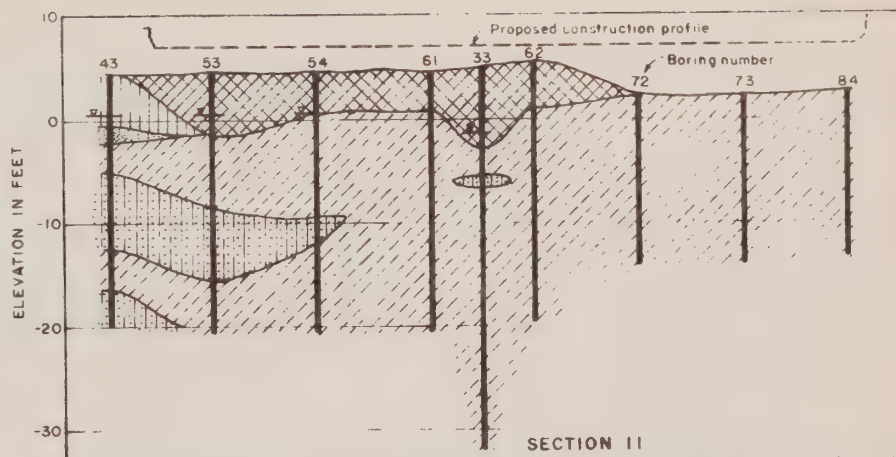
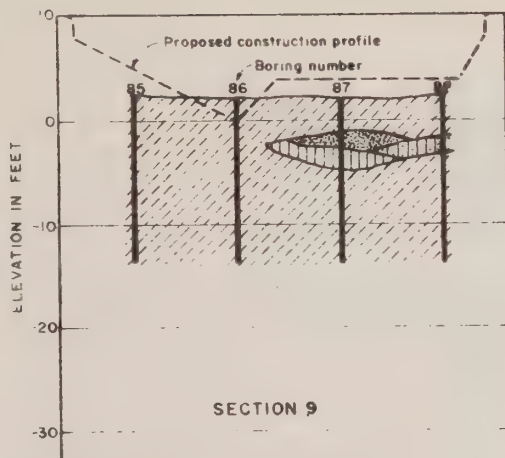
NOTE: HORIZONTAL SCALE IS TEN TIMES VERTICAL SCALE
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ENVIRONMENTAL STATEMENT
 CONTRA COSTA COUNTY CALIFORNIA

WEST CONTRA COSTA
 SANITARY LANDFILL PROJECT

CLASS 1 AREAS
 SUBSURFACE SECTIONS

U.S. ARMY ENGINEER DIST., SAN FRANCISCO, CALIF.
 TO ACCOMPANY REPORT
 DATED MARCH 1975
 FILE NO.



NOTE: HORIZONTAL SCALE IS TEN TIMES VERTICAL SCALE
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ENVIRONMENTAL STATEMENT

CONTRA COSTA COUNTY CALIFORNIA

WEST CONTRA COSTA

SANITARY LANDFILL PROJECT

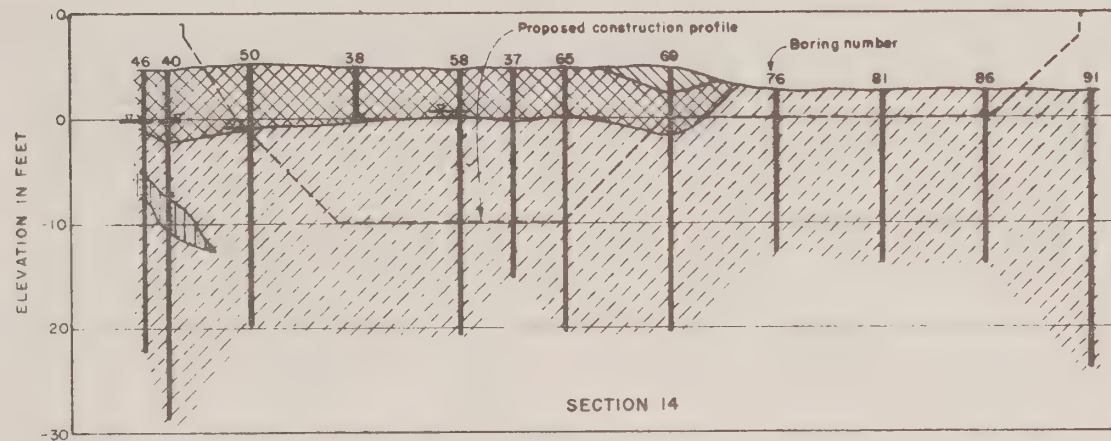
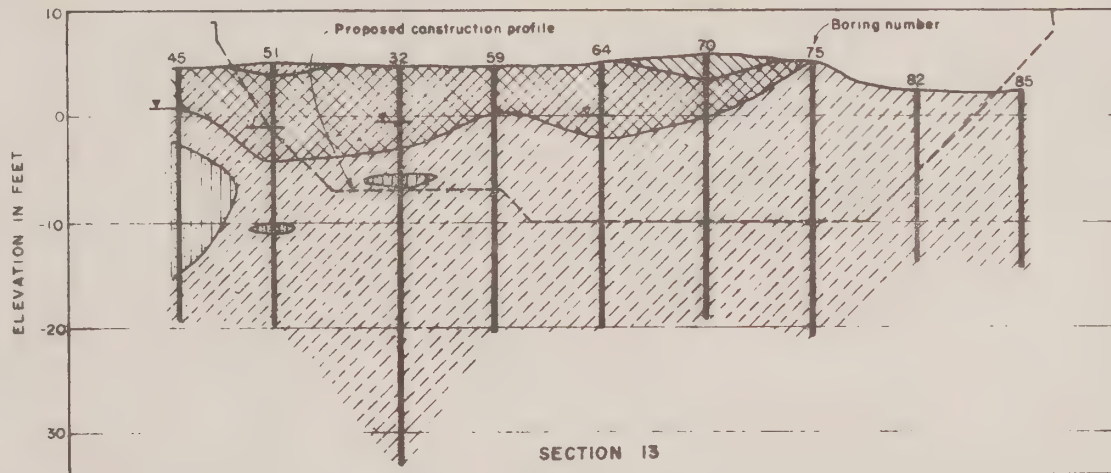
CLASS 1 AREAS

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U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C OF E

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FILE NO.



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ENVIRONMENTAL STATEMENT

CONTRA COSTA COUNTY CALIFORNIA

WEST CONTRA COSTA

SANITARY LANDFILL PROJECT

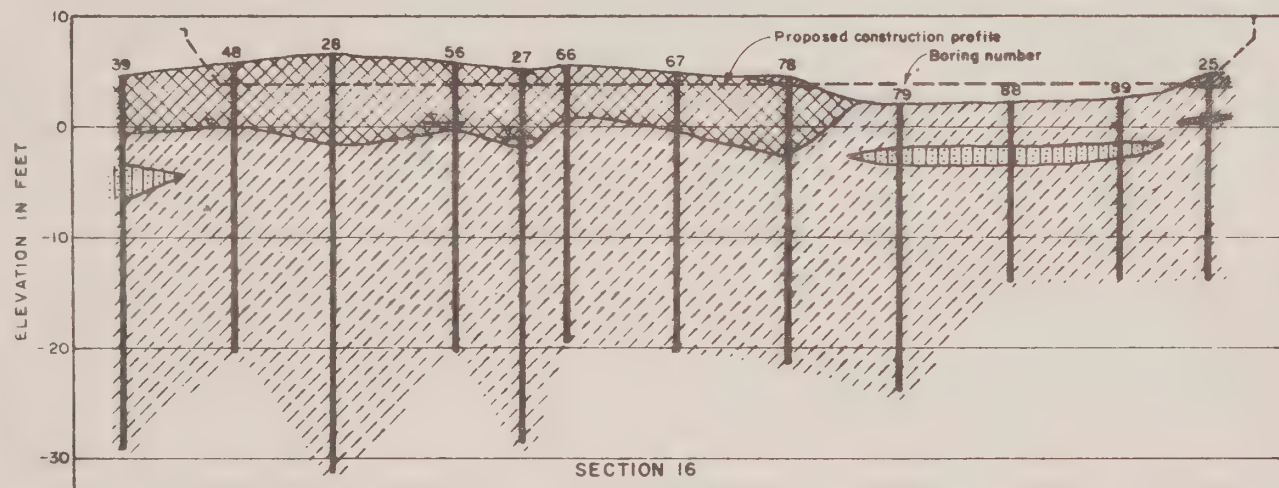
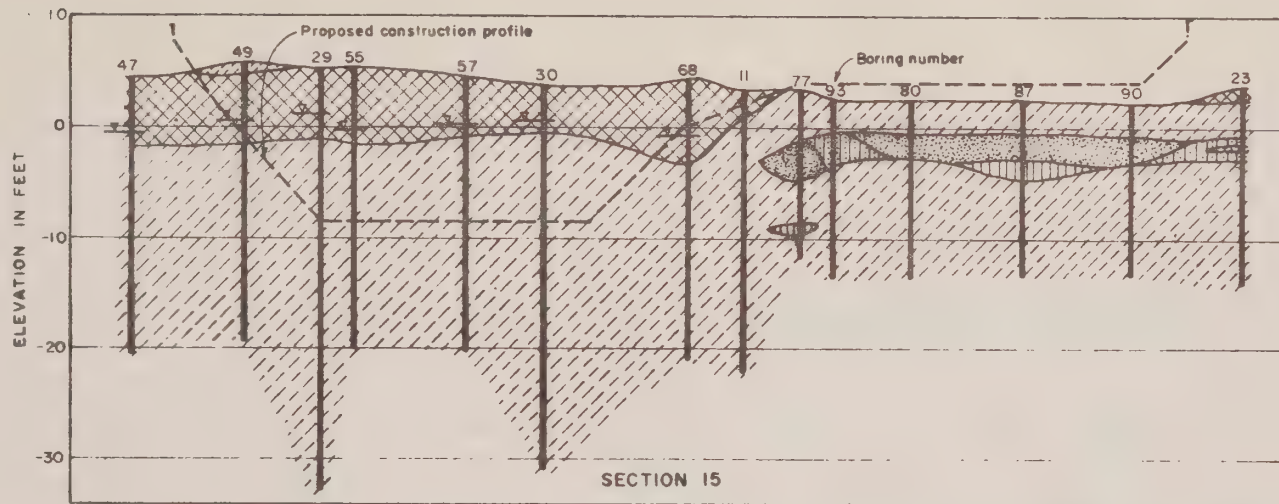
CLASS 1 AREAS

SUBSURFACE SECTIONS

U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C OF E

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TO ACCOMPANY REPORT
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NOTE: HORIZONTAL SCALE IS TEN TIMES VERTICAL SCALE
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ENVIRONMENTAL STATEMENT

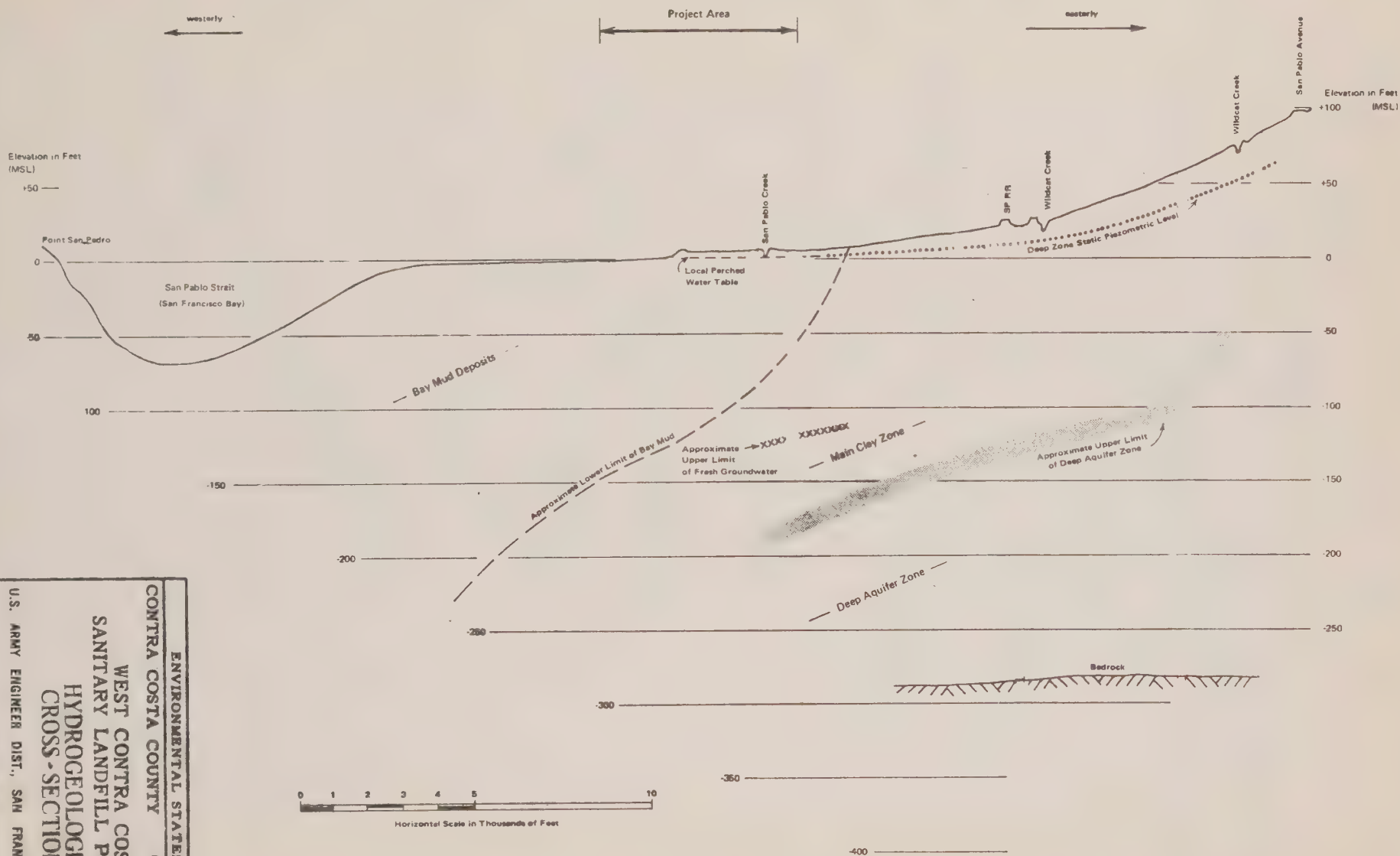
CONTRA COSTA COUNTY CALIFORNIA

WEST CONTRA COSTA
 SANITARY LANDFILL PROJECT

CLASS 1 AREAS
 SUBSURFACE SECTIONS

U.S. ARMY ENGINEER DIST., SAN FRANCISCO, CALIF. OF E

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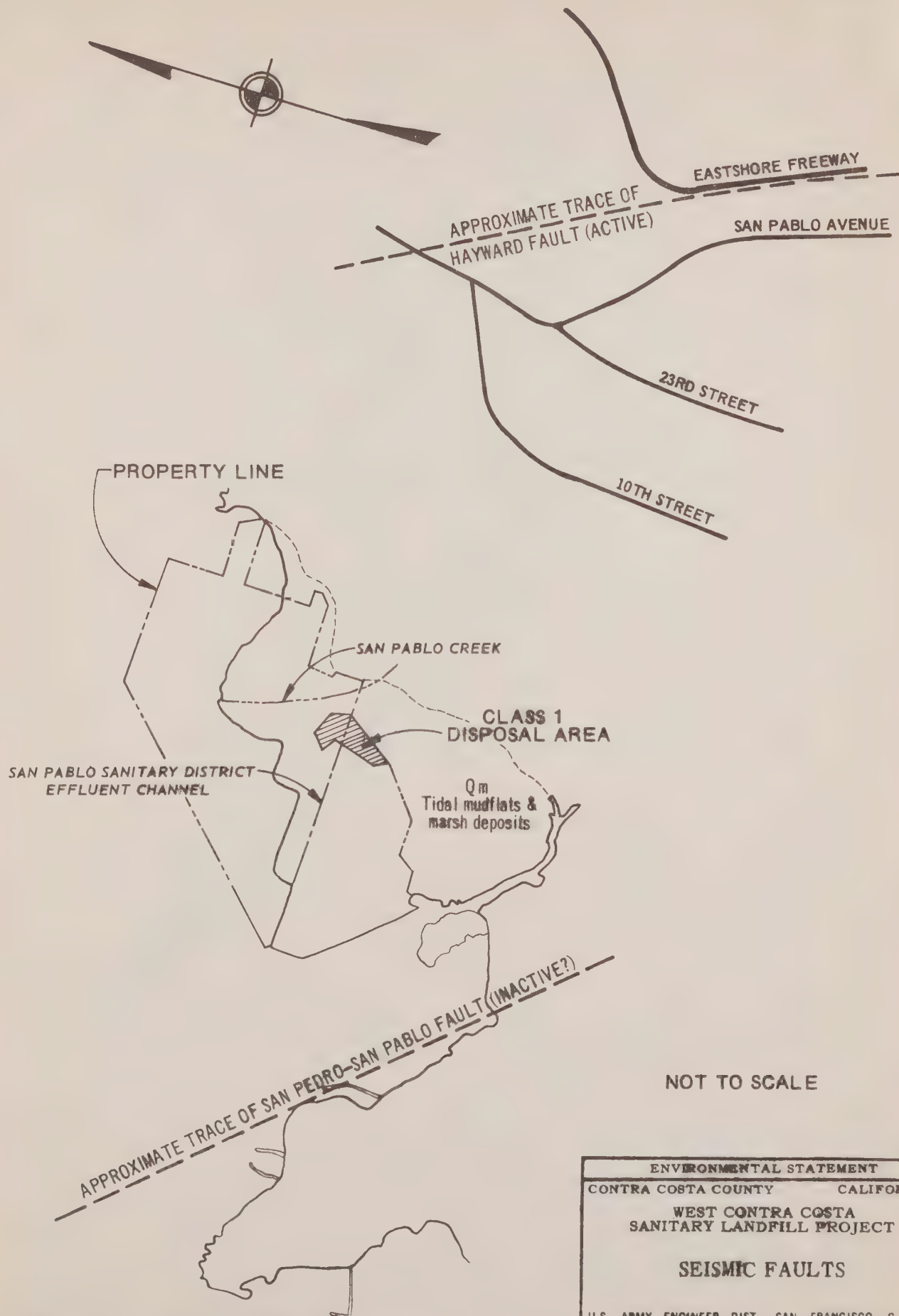
SOURCE: MODIFIED FROM NEVIN AND ELLIS, 1971

ENVIRONMENTAL STATEMENT

CONTRA COSTA COUNTY CALIFORNIA

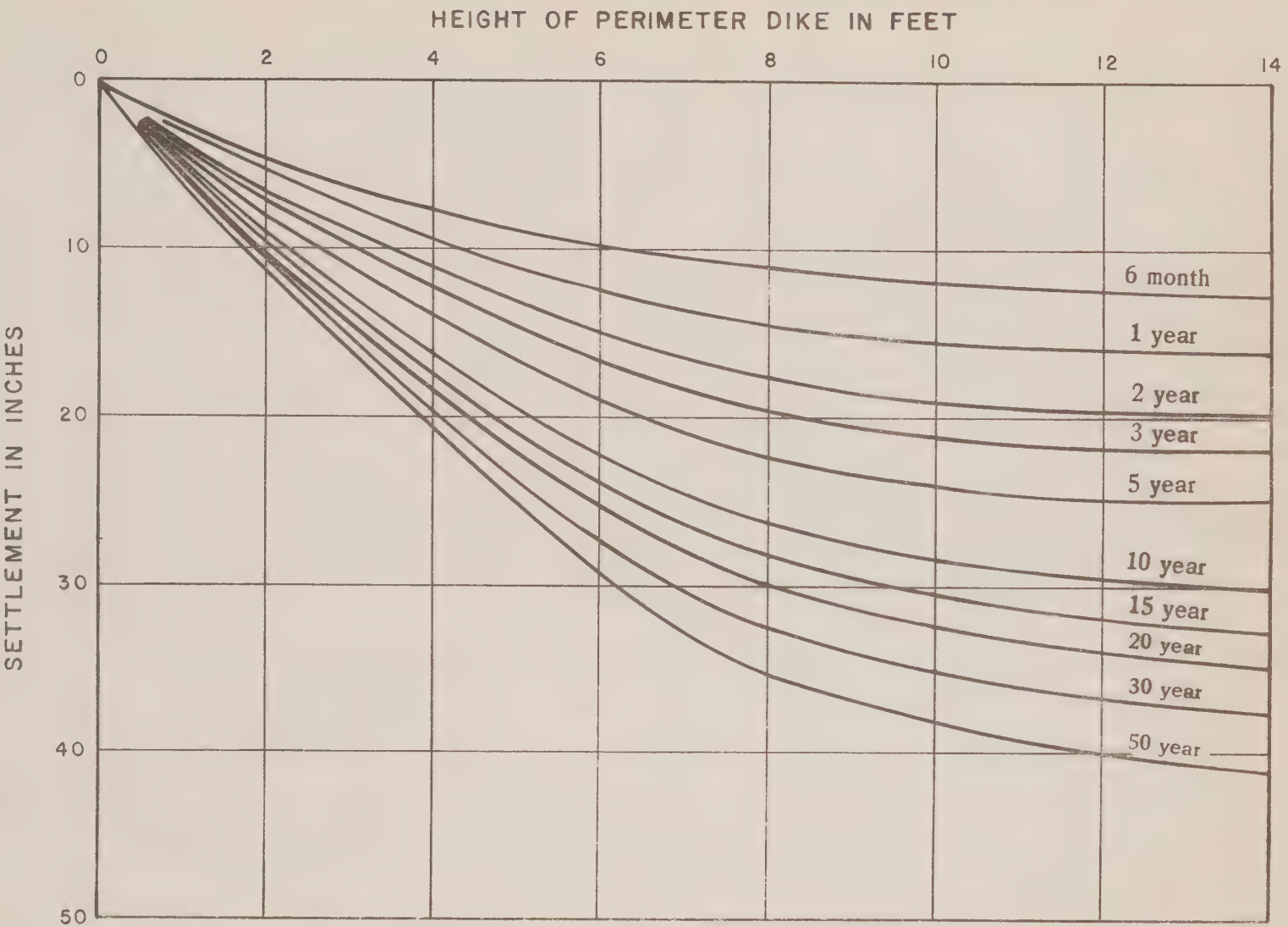
WEST CONTRA COSTA
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HYDROGEOLOGIC
CROSS-SECTION

U.S. ARMY ENGINEER DIST., SAN FRANCISCO, CALIF. E
TO ACCOMPANY REPORT
DATED MARCH 1975
FILE NO.



SOURCE: Cooper-Clark and Associates, Dec. 1971

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| SEISMIC FAULTS | |
| U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C OF E FILE NO. | |
| TO ACCOMPANY REPORT DATED MARCH 1975 | |

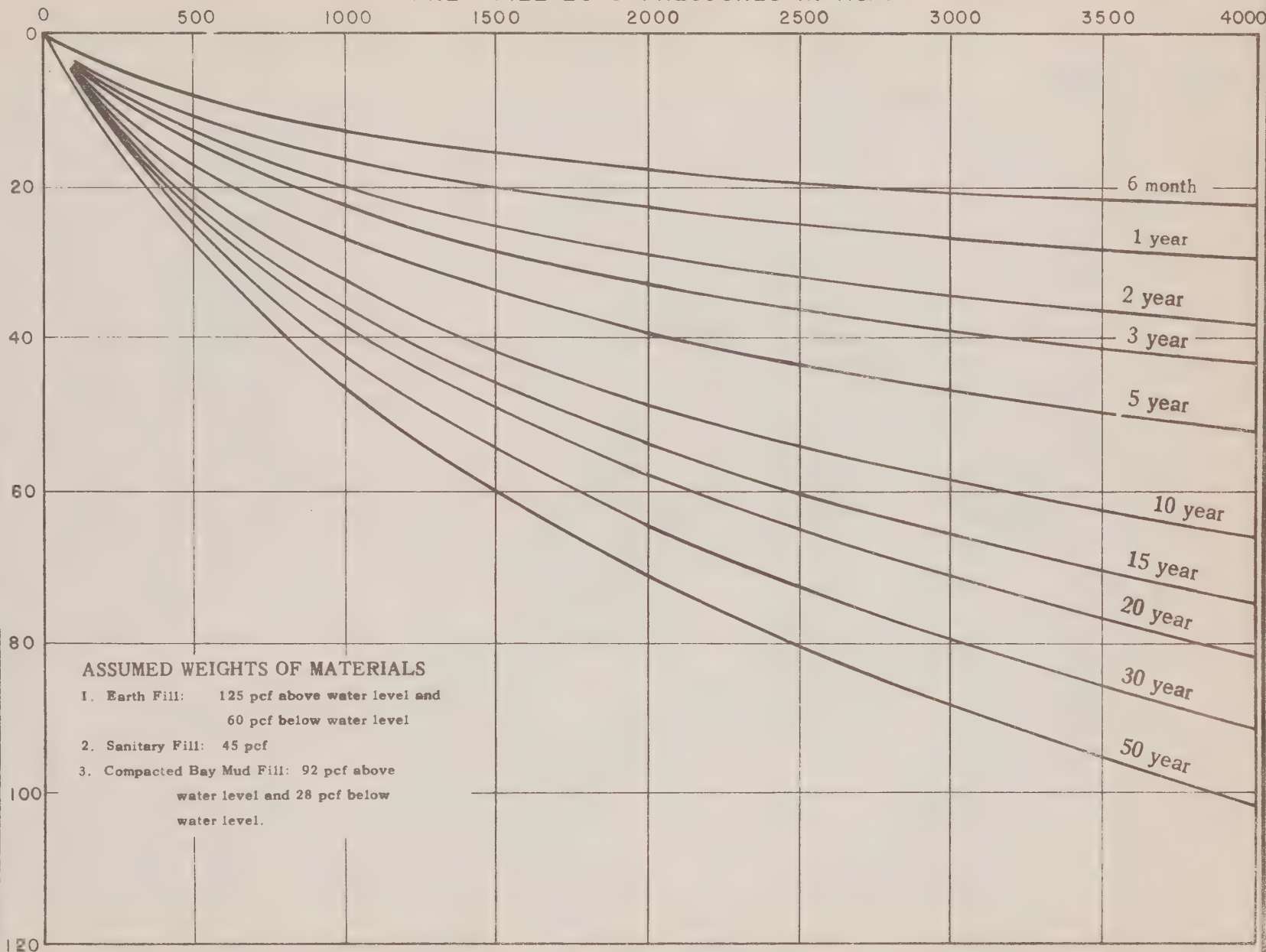


SOURCE: Cooper-Clark & Associates,
Dec. 1971

ENVIRONMENTAL STATEMENT
CONTRA COSTA COUNTY CALIFORNIA
WEST CONTRA COSTA
SANITARY LANDFILL PROJECT
ESTIMATED SETTLEMENT OF
PERIMETER DIKES
U.S. ARMY ENGINEER DIST. SAN FRANCISCO, C. OF E.
TO ACCOMPANY REPORT
DATED MARCH 1975
FILE NO.

AREA FILL LOAD PRESSURES IN P.S.F.

SEHCNI NI NEMETLTLES



ASSUMED WEIGHTS OF MATERIALS

1. Earth Fill: 125 pcf above water level and 60 pcf below water level
2. Sanitary Fill: 45 pcf
3. Compacted Bay Mud Fill: 92 pcf above water level and 28 pcf below water level.

ENVIRONMENTAL STATEMENT

CONTRA COSTA COUNTY CALIFORNIA

WEST CONTRA COSTA

SANITARY LANDFILL PROJECT

CALCULATED SETTLEMENTS OF
BAY MUD DUE TO AREAL FILLS

U.S. ARMY ENGINEER DIST., SAN FRANCISCO, C OF E

TO ACCOMPANY REPORT

FILE NO.

DATED MARCH 1975

SOURCE: Cooper-Clark & Associates,

Dec 1971



SOURCE: Contra Costa County, 1973

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APPENDICES

APPENDIX A

MISCELLANEOUS SUPPORTING DOCUMENTS

APPENDIX A

MISCELLANEOUS SUPPORTING DOCUMENTS

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| A-2 | Letter from Tinning & DeLap, Attorneys at Law, to U.S. Army Corps of Engineers, San Francisco District, dated 23 August 1973. Subject: Supplemental permit application. | A-5 |
| A-3 | Letter from the San Francisco Bay Conservation and Development Commission to U.S. Army Corps of Engineers, San Francisco District, dated 12 January 1973. Subject: Richmond Sanitary Service permit application. | A-12 |
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| A-9 | Public Notice 74-0-48 | A-24 |

TINNING & DELAP

ATTORNEYS AT LAW

FINANCIAL CENTER BUILDING

LOCUST AND BONANZA STREETS

WALNUT CREEK, CALIFORNIA 94597

935-0700

OTHER OFFICES

WELLS FARGO BANK BUILDING

RICHMOND, CALIFORNIA 94804

(415) 235-0252

T. H. DELAP (RETIRED)
A. B. TINNING (1887-1965)
DANA MURDOCK
ROBERT T. ESHLEMAN
CHARLES A. WOOD, JR.
AUSTIN R. GIBBONS
JAY P. SANDERS
MICHAEL T. STODDARD
KEITH HOWARD
RICHARD H. BARTKE

December 13, 1972

District Engineer
U. S. Army Corps of Engineers
100 McAllister Street
San Francisco, California 94102

Dear Sir:

Richmond Sanitary Service, a partnership, Industrial Land Company, a partnership, Richard Granzella and Jearenne Granzella, his wife, and Caesar Aquilino and Katherine Aquilino, his wife, are owners of approximately 900 acres of tidelots situated midway between Point Pinole and Point San Pablo, offshore of San Pablo Bay (San Francisco Bay). A portion of said tidelots are within the corporate limits of the City of Richmond and a portion are in the unincorporated area of Contra Costa County, as more particularly shown on the Location Map, being Exhibit "A" attached hereto. Approximately 350 acres of these lands provide a public refuse disposal facility servicing all of West Contra Costa County and the cities of Sausalito and Mill Valley in Marin County.

These owners hereby make application to the Army Corps of Engineers as follows:

1. For a permit confirming and approving all existing dikes and embankments, including rehabilitation, completion and permanent maintenance of such dikes and embankments, as outlined on Exhibit "B" attached hereto; and validating the placement of all existing fill and material behind said dikes and embankments.
2. For permission to continue the sanitary land fill operations behind said existing dikes and embankments in connection with future sanitary land fill operations of applicant.

TINNING & DELAP

District Engineer
U. S. Army Corps of Engineers
December 13, 1972
Page Two

It is our understanding that a portion of applicant's lands as outlined in Exhibit "B" are situated above the mean higher, high water mark. Accordingly, this application is made with respect to those lands, embankments and fill, as outlined in Exhibit "B", behind the existing dikes on the lands of applicant lying below the mean higher, high water mark.

The dikes shown on Exhibit "B" have been in existence prior to October, 1964. Some of the dikes were originally constructed to comply with the requirements of the Regional Water Quality Control Board, San Francisco Bay Region. The subject properties of applicant are authorized for use as refuse disposal premises under permits issued by the County of Contra Costa and the City of Richmond. These uses also conform with the General Plans of the City of Richmond and the County of Contra Costa and conform with the Bay Conservation and Development Commission, San Francisco Bay Plan, January, 1969, and meet all of the current requirements of the Regional Water Quality Control Board, San Francisco Bay Region.

Applicant has guaranteed to the County of Contra Costa and to the respective cities and governmental districts within its sphere of operations that its properties will be maintained and used as a site for public refuse disposal through the year 2000.

While this application only deals with 350 acres of lands outlined in Exhibit "B", applicant has caused to be prepared the "San Pablo Bay Regional Park Development Plan Concept", a copy of which is attached hereto marked Exhibit "C", which includes all of its tidelot holdings, including the lands outlined in Exhibit "B". This plan is presently in the conceptual stages, but indicates the intent of applicant as to future development of all of its tideland properties for park and regional recreational purposes, including a marina, equestrian center, golf course, swimming and bathing beaches, outdoor education facility, outdoor bowl, fishing pier and retention of 136 acres of tidal marsh in its natural state. As to this application -- and including the balance of tidelots of applicant not included within the scope of this application -- endorsements have been received from the County of Contra Costa, the cities of Richmond and San Pablo, the San Pablo Sanitary District and the Contra Costa County Flood Control and Water Conservation District. Copies of these endorsements are attached

District Engineer
U. S. Army Corps of Engineers
December 13, 1972
Page Three

as Exhibits "D"-1, "D"-2, "D"-3, "D"-4, "D"-5(a) and "D"-5(b).

At the public hearing before the Board of Supervisors held October 24, 1972, at Martinez, California, to review and consider the proposed comprehensive General Plan for the North Richmond - San Pablo Bay Study area, an amendment to the County General Plan, including the lands of applicant outlined in Exhibit "B", for use as a public refuse disposal facility and long range regional recreation uses, it received unanimous endorsements by everyone who testified at the hearing, including the following:

Mrs. Thomas Edwards
Mrs. Barbara Vincent
Mr. Herman D. Ruth
Mr. Paul Christie
Mr. Boaston Woodson
Mr. Elmer Freethy
Mrs. Angela Call

Theresa Talley
J. W. Halloman
Lloyd G. Madden
Willie F. Dorsey
Florence Klinger
Ned Robinson

Names and addresses of the owners of property adjacent to the land subject to this application are as follows:

Standard Oil Company of California
Richmond, California

Elmer J. Freethy
Richmond, California

Richmond Rod and Gun Club
Goodrick Avenue
Richmond, California

Rohm and Haas
Washington Square
Philadelphia, Pennsylvania

TINNING & DELAP

District Engineer
U. S. Army Corps of Engineers
December 13, 1972
Page Four

Bethlehem Steel Company
100 California Street
San Francisco, California

Very truly yours,

TINNING & DeLAP

Dana Murdock

By: Dana Murdock
Attorneys for Richmond Sanitary Service,
a partnership, Industrial Land Company,
a partnership, Richard Granzella and
Jearenne Granzella, his wife, and Caesar
Aquilino and Katherine Aquilino, his wife,
Applicant.

DM/hm
Enclosures

T. H. DeLAP (RETIRED)
A. B. TINNING (1887-1965)
DANA MURDOCK
ROBERT T. ESHLEMAN
CHARLES A. WOOD, JR.
AUSTIN R. GIBBONS
JAY F. SANDERS
MICHAEL T. STODDARD
KEITH HOWARD
THOMAS A. PALMER

TINNING & DeLAP
ATTORNEYS AT LAW
1615 BONANZA STREET
WALNUT CREEK, CALIFORNIA 94597
(415) 935-0700

MAILING ADDRESS
P. O. BOX 4713
OTHER OFFICES
RICHMOND, CALIFORNIA

August 23, 1973

District Engineer
U. S. Army Corps of Engineers
100 McAllister Street
San Francisco, California 94102

Gentlemen:

This letter will supplement the application of Richmond Sanitary Service, a partnership; Industrial Land Company, a partnership; Richard Granzella and Jearenne Granzella, his wife; and Caesar Aquilino and Katherine Aquilino, his wife; dated December 13, 1972, and will also reply to the letter dated July 6, 1973, from James C. Wolfe, Chief, Construction - Operations Division, to the undersigned.

Mr. Wolfe's letter requests that certain additions or revisions to the letter of application be made as follows:

"A.

3. Volume of fill (existing & proposed, listed separately)"

Answer:

Existing fill - It is estimated that 2,700,000 cubic yards of additional "in place" material has been added to the 350 acres involved in this application. This is based upon actual field measurements by our civil engineers, Kister, Savio & Rei, Inc., corroborated by calculating the volume of material deposited at the site each day - with allowance for compaction and consolidation. A substantial quantity of this material has been deposited on a portion of the 350 acres above the line of your jurisdiction.

TINNING & DELAP

District Engineer,
U. S. Army Corps of Engineers
August 23, 1973
Page Two

Proposed fill - 9,000,000 cubic yards will be added over the next 52 years. This is based on the projected useful life of the sanitary land fill and the type of material being deposited at this time, taking into account new and modern compaction techniques which have been instituted, with a possible reduction in volume as a result of recycling procedures now being considered and which are in use at other sanitary land fill operations in the San Francisco Bay Region.

"4. Type of fill material in proposed fill."

Answer:

- (a) Garbage, rubbish and swill collected from the householders.
- (b) Commercial rubbish.
- (c) Industrial materials, e.g., liquid wastes and barrel storage, etc.
- (d) Demolition debris, tree and garden trimmings and miscellaneous material brought in by others, e.g., residents, etc.
- (e) Clean fill used for covering of layers of refuse, facing of slopes and final grading for proper drainage.

"6. Other, specify Areas (in acres) of existing fill and proposed fill."

Answer:

- (a) Existing area of fill, 198 acres (partially filled).
- (b) Proposed fill area, 350 acres, which includes the 198 acres presently being used.

TINNING & DELAP

District Engineer,
U. S. Army Corps of Engineers
August 23, 1973
Page Three

The exhibits attached show that the surface of the sanitary land fill will be uniform, with allowances for drainage. Upon completion of the useful life of the sanitary land fill it is entirely likely that the surface will be recontoured to meet the requirements of new uses, presently conceived to be regional water-oriented open space recreation, including a marina, golf course, equestrian center, fishing pier and nature study areas.

The balance of the revisions and additions requested in Mr. Wolfe's letter are reflected in the attachments, consisting of sectional views, revised vicinity map and revised plan view.

If additional information is desired, please communicate with the undersigned.

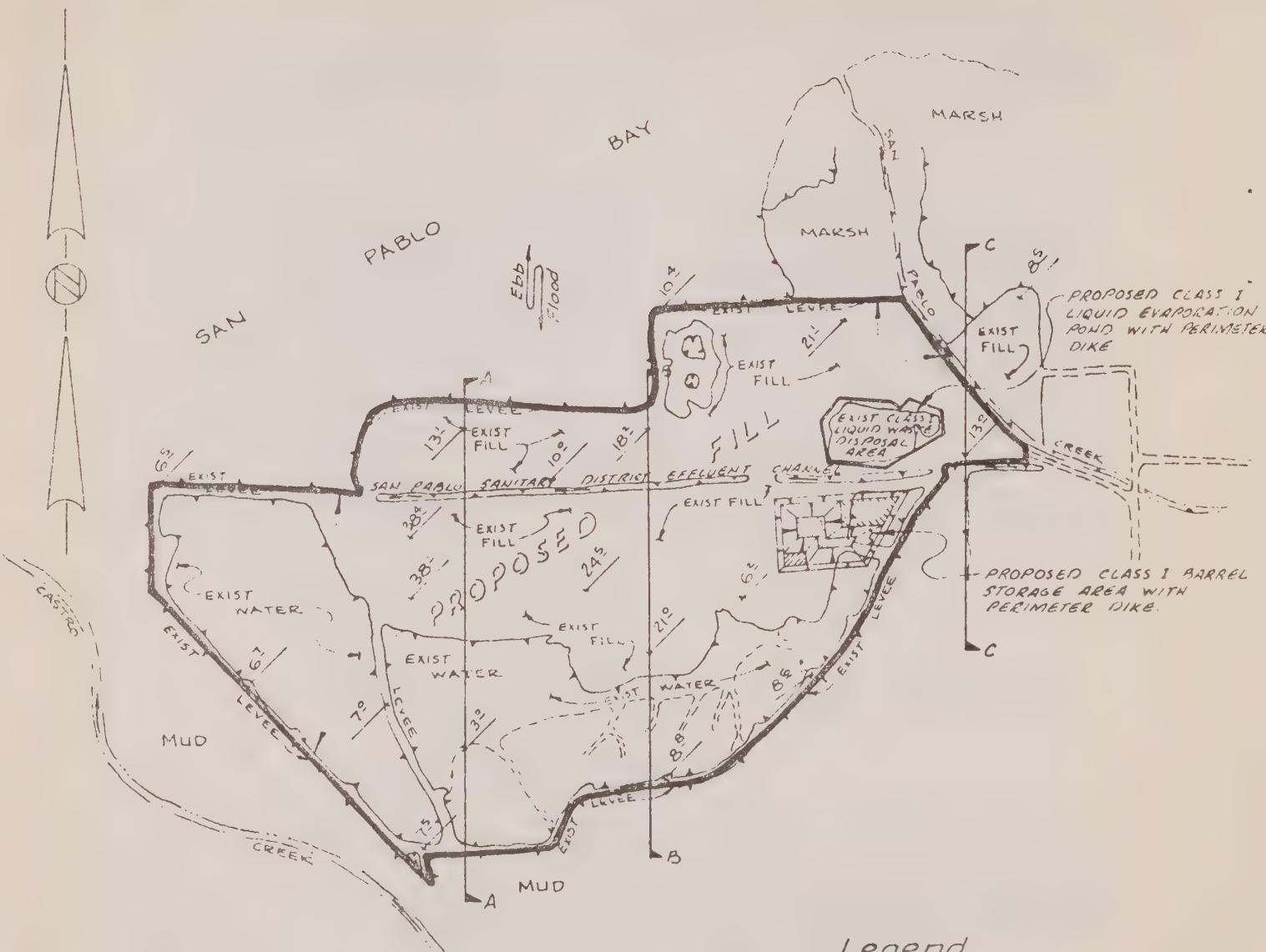
Very truly yours,

TINNING & DeLAP

Dana Murdock

By: Dana Murdock
Attorneys for Applicants

DM/hm
Enclosures
cc: Mr. Mike Rei
Mr. Richard Granzella



PLAN

SCALE

0 1,200' 2,400'

Legend

ABOVE MHHW

BELOW MHHW

MEAN HIGHER HIGH WATER LINE -

5.0 FT. MLLW DATUM

Existing and Proposed Levees and Fill

in SAN PABLO BAY

at RICHMOND

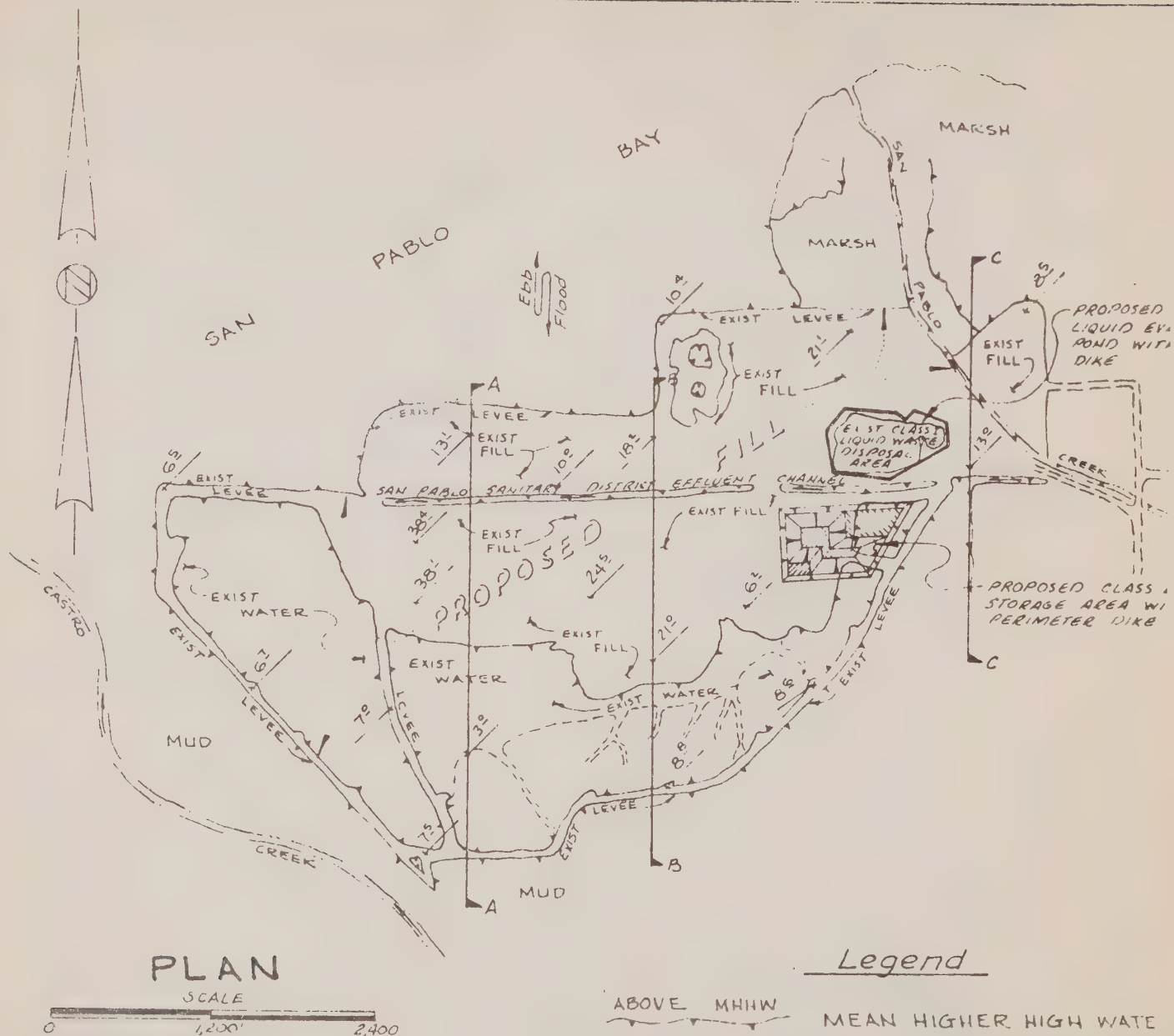
County of CONTRA COSTA, State CALIF.

Application by RICHMOND SANITARY

SERVICE

Date 12-13-72

REVISED 8-23-73



Existing and Proposed Levees and

in SAN PABLO BAY

at RICHMOND

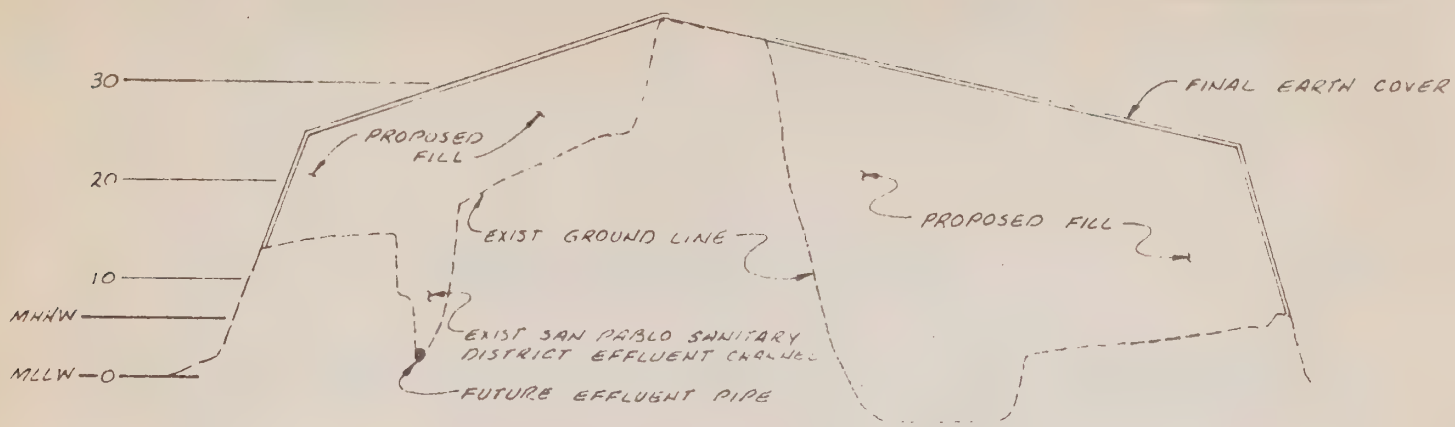
County of CONTRA COSTA, State

Application by RICHMOND SANITARY

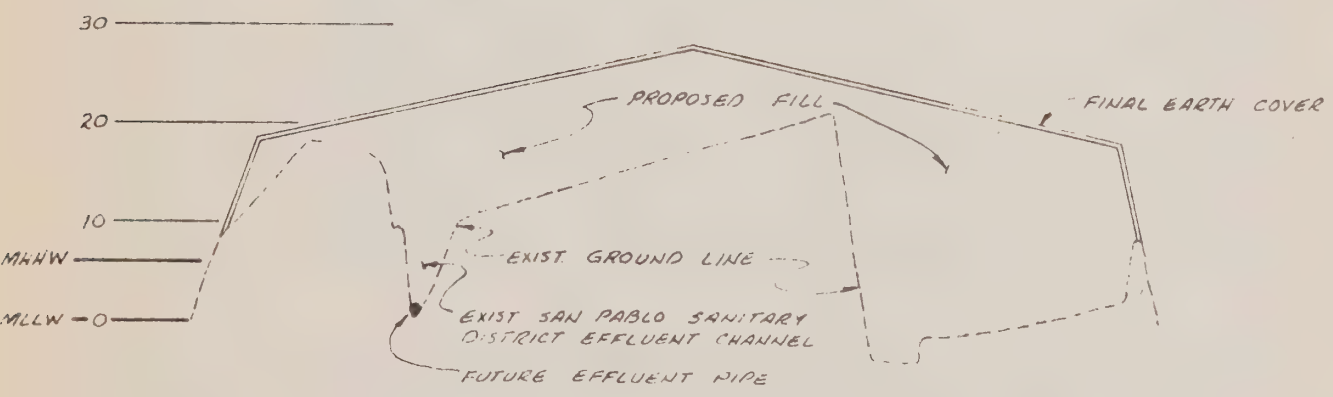
SERVICE

Date 12-13

REVISED 8-2

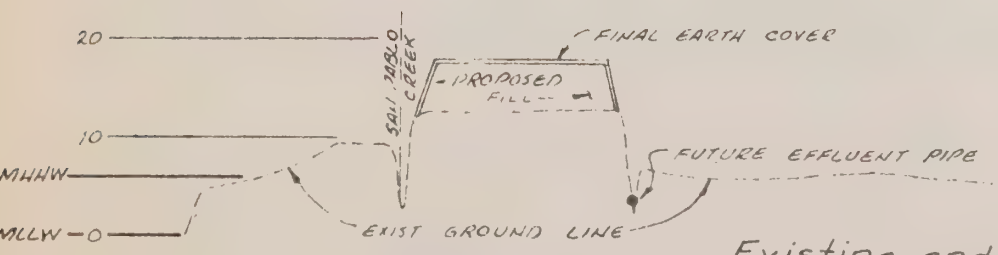


SECTION A-A
N-S COORDINATE 1,454,585



SECTION B-B
N-S COORDINATE 1,456,000

SCALE: HORIZ ~ 1"=600'
VERT. ~ 1"=20'



SECTION C-C
N-S COORDINATE 1,458,300

Existing and Proposed Levees and F
in SAN PABLO BAY
at RICHMOND

County of CONTRA COSTA, State CA

Application by RICHMOND SANITAR

A-11 SERVICE Date 12-13-72

REVISED 11-27-75

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION

30 VAN NESS AVENUE
SAN FRANCISCO, CALIFORNIA 94102
PHONE: 557-3686

MELVIN E. DANE
Chairman

WILLIAM D. EVERS
Vice Chairman

JOSEPH E. BODOVITZ
Executive Director

January 12, 1973

Col. James L. Lammie
District Engineer
U. S. Army Corps of Engineers
100 McAllister Street
San Francisco, California 94102

Re: Richmond Sanitary Service Permit Application

Dear Col. Lammie:

As you know, Richmond Sanitary Service has filed permit applications with both BCDC and the Corps for its refuse disposal site in Richmond that is now diked off from the Bay. Normally, in such a situation, BCDC would process the permit application first and the Corps' processing would follow. Because of the unusual circumstances of this application, however, we believe it desirable for the usual procedure to be changed and for the Corps to proceed first. This would enable the principal issue to be considered first, i.e., the question of the legality of the dikes in view of the Corps' jurisdiction.

For this procedure to be followed, it will, however, be necessary for the applicant, Richmond Sanitary Service, to concur, because under California law, BCDC must act on the application by May 1, 1973, or a permit will automatically be granted. We will therefore suggest to the applicant, by copy of this letter, that if the applicant does concur, it agree in writing either to withdraw its application to BCDC without prejudice, or to indefinitely extend the time period specified in California Government Code Section 66632 (f), with the provision that the applicant can, upon 90 days written notice to the Commission, ask that the time period specified in Government Code Section 66632 (f) be started.

Upon receipt of a reply from Richmond Sanitary Service, we will advise you further.

Yours very truly,

Joseph E. Bodovitz
JOSEPH E. BODOVITZ
Executive Director

cc: Dana Murdock, Richmond Sanitary Service
William D. Evers
Francis Boone
E. Clement Shute

KISTER, SAVIO & REI INC.

LAND SURVEYORS & CIVIL ENGINEERS

DONALD E. KISTER (1905-1969)

CHARLES J. SAVIO
LICENSED LAND SURVEYOR

MICHAEL P. REI
REGISTERED CIVIL ENGINEER

11818 SAN PABLO AVENUE

EL CERRITO, CALIF. 94530

TELEPHONE 234-7880

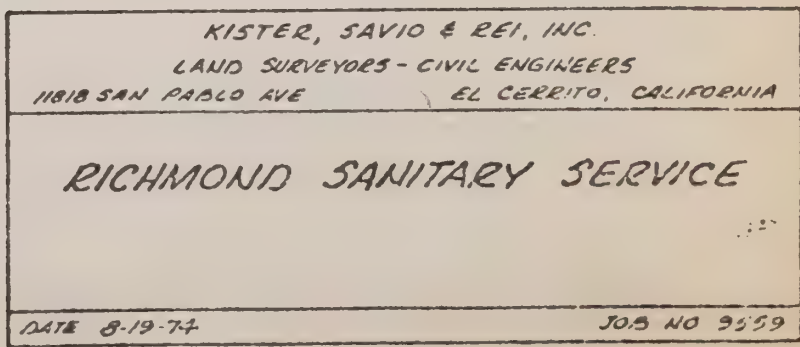
August 13, 1974

DESCRIPTION RICHMOND SANITARY SERVICE

Real property lying partly in the City of Richmond, and partly in the unincorporated area of Contra Costa County, described as follows:

A portion of Sections 2 and 3, Township 1 North, Range 5, West and a portion of Sections 34 and 35, Township 2 North, Range 5 West, Mount Diablo Meridian, described as follows:

Beginning at the southeast corner of Tide Lot 29 in said Section 35; thence West, 660.0 feet to the southwest corner of said Tide Lot 29; thence South $48^{\circ} 19' 34''$ West, 252.9 feet; thence South $32^{\circ} 07'$ West, 1350.0 feet; thence South $47^{\circ} 36' 23''$ West, 1290.62 feet; thence South $81^{\circ} 56' 30''$ West, 788.0 feet to the western line of said Section 2; thence North $79^{\circ} 52' 30''$ West, 188.57 feet; thence South $31^{\circ} 30'$ West, 446.82 feet to the southern line of Lot 16 in said Section 3; thence West, 900.9 feet to the southwest corner of Lot 15 in said Section 3; thence South, 289.22 feet to the southeast corner of Lot 14 in said Section 3; thence North $41^{\circ} 45'$ West, 2973.50 feet to the southwest corner of Lot 5 in said Section 3; thence North, 710.82 feet to the northern line of said Section 3; thence East, 1500.0 feet; thence North $8^{\circ} 37'$ East, 667.53 feet; thence South $86^{\circ} 12' 14''$ East, 2114.64 feet; thence North 800.0 feet to the northern line of Lot 25 in said Section 35; thence East, 2840.0 feet to a point distant 50.0 feet West of the northeastern corner of Lot 29 in said Section 35; thence South, 487.08 feet; thence East, 50.0 feet to the eastern line of said Lot 29 in Section 35; thence South, 832.92 feet to the point of beginning.



U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS
100 McALLISTER STREET
SAN FRANCISCO, CALIFORNIA 94102

PUBLIC NOTICE NO. 65-26

TO WHOM IT MAY CONCERN:

10 November 1964

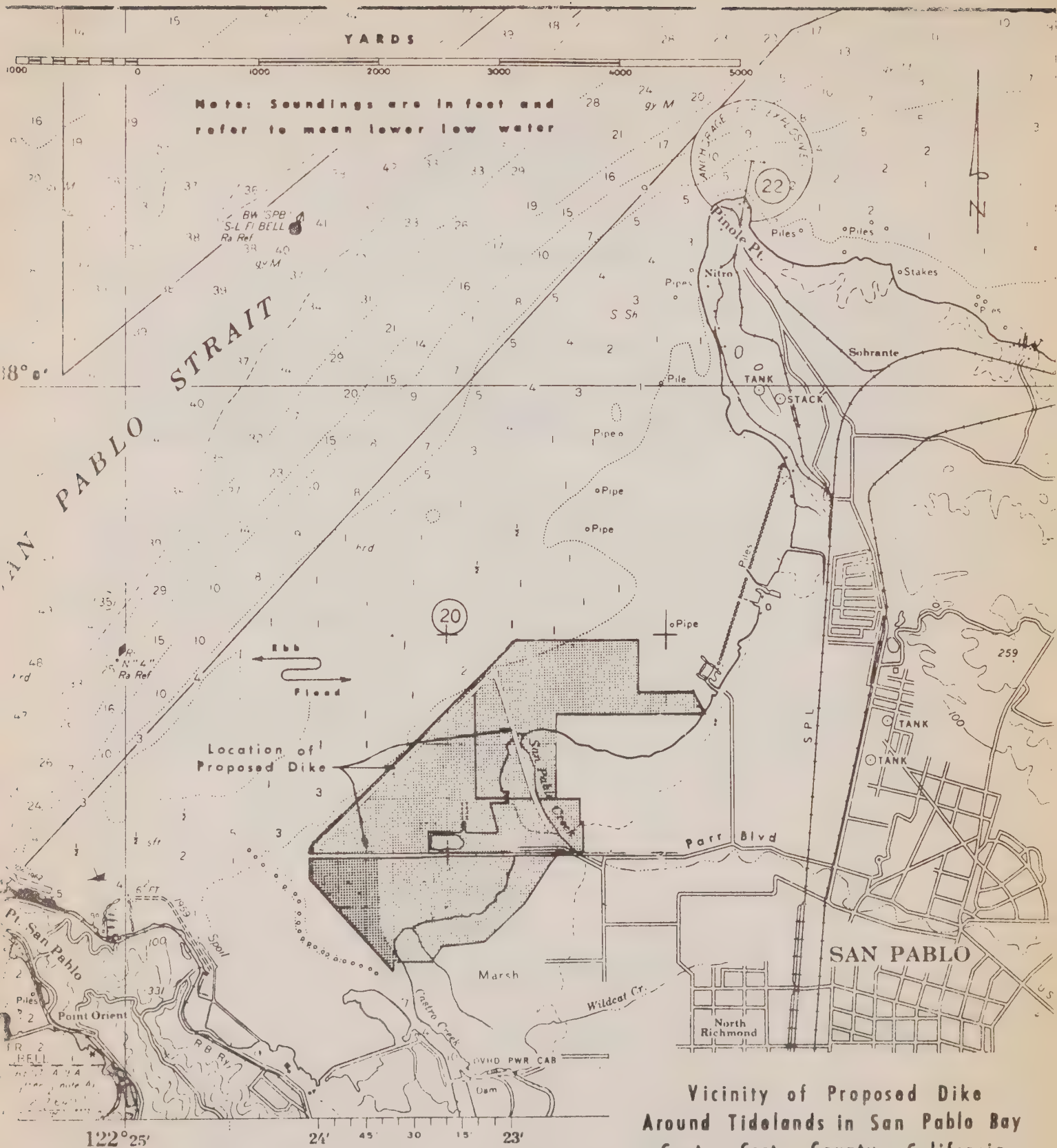
The Richmond Sanitary Service, 1224 Nevin Avenue, Richmond, California has applied for a Department of the Army permit to construct a dike on privately owned tidelands in San Pablo Bay at Richmond, Contra Costa County, California, in connection with a sanitary land fill operation for refuse from West Contra Costa County and the cities of Mill Valley and Sausalito in Marin County.

A permit issued by the Department of the Army does not give any property rights either in real estate or materials, or any exclusive privileges; and does not authorize any injury to private property or invasion of private rights, or any infringement of Federal, State, or local laws or regulations, nor does it obviate the necessity of obtaining State assent to the work authorized. It merely expresses the assent of the Federal Government, only insofar as concerns the public rights of navigation.

Interested parties may submit in writing, in triplicate, any objections that they may have to the proposed work. Objections should be forwarded so as to reach this office not later than thirty (30) days from date of this notice. The location and plans of the proposed work are included with this notice.

ROBERT H. ALLAN
Lt. Colonel, CE
District Engineer

SAN FRANCISCO BAY MASTER MAILING LIST



Vicinity of Proposed Dike
Around Tidelands in San Pablo Bay
Contra Costa County, California

Application by
Richmond Sanitary Service

sheet 1 of 2

Oct. 10, 1964

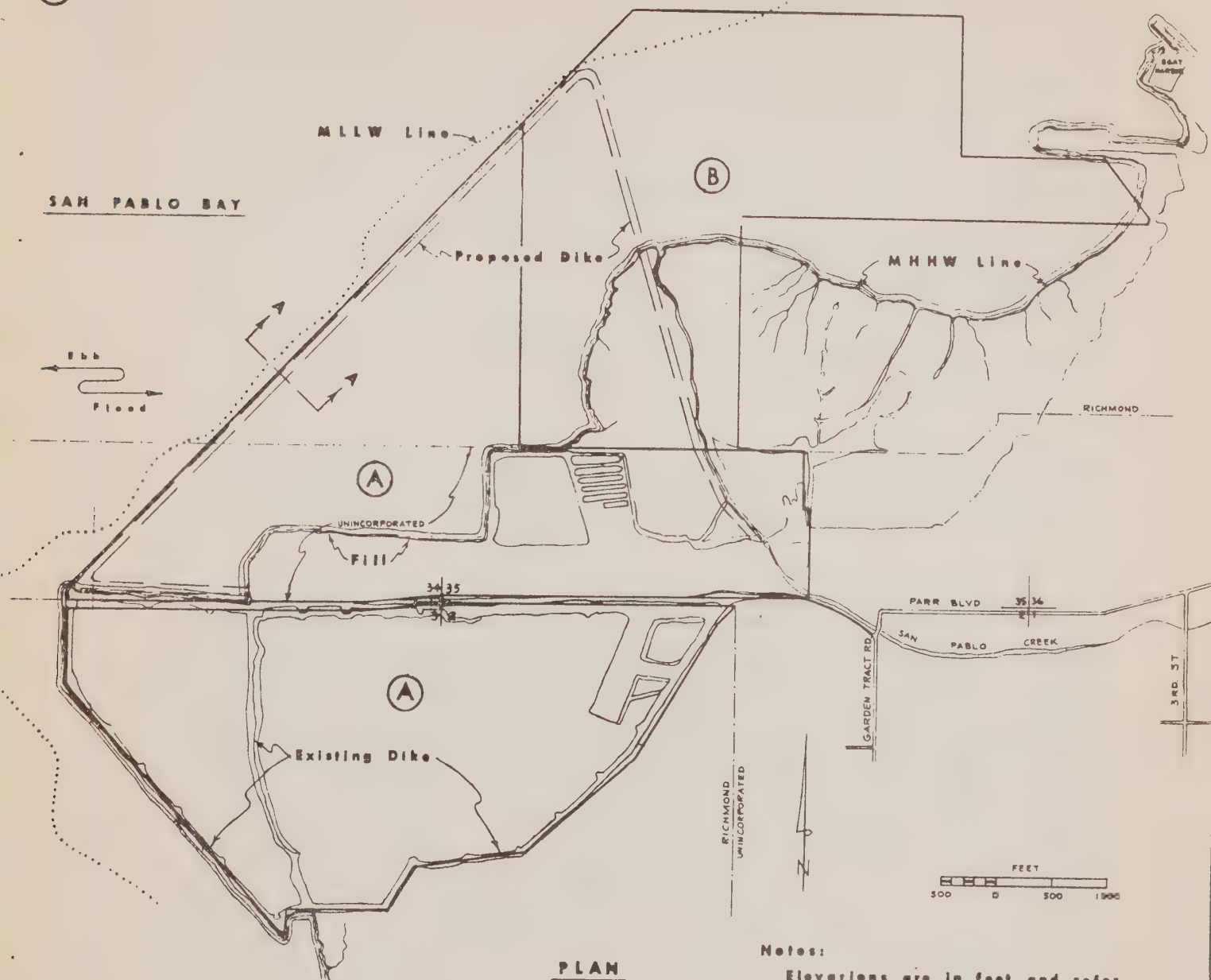
Rev. 11-2-64

Prepared by: W. J. O'CONNELL & ASSOC.
From U.S.C.&G.S. Map No. 5533

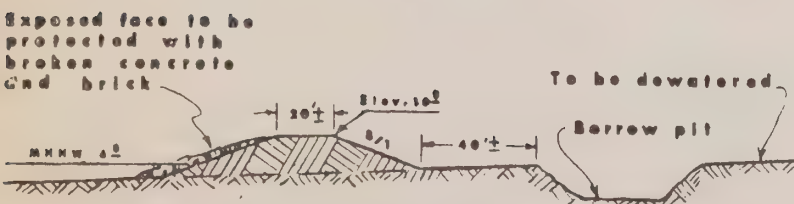
Property Ownership:

- (A) Richmond Sanitary Service
- (B) Industrial Land Company

Prepared by: W.J. O'CONNELL & ASSOCIATES
 From Aerial AVP 524, Clyde Sunderland
 Situation as of 7-7-64

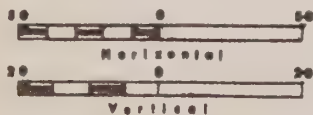


PLAN



Section A-A of Dredged Dike

Scales of Feet



Notes:

Elevations are in feet and refer to MLLW.
 Harbor lines are not established.

Proposed Dike
Around Tidelands in San Pablo Bay
Contra Costa County, California
Application by
Richmond Sanitary Service
Sheet 2 of 2

Oct. 10, 1964

Rev. 11-2-64

SPNOC

13 October 1971

Wolfe

Rathbun

Roberts

CERTIFIED MAIL RETURN RECEIPT REQUESTED

Richmond Sanitary District
1224 Navin Avenue
Richmond, California 94801

Attention: Mr. Richard Granzella, President

Gentlemen:

Reference is made to existing dikes and/or levees constructed by you around tidelands in San Pablo Bay, Contra Costa County, California, without permit as required by Title 33, U. S. Code, Sections 401 et seq.

At a meeting in this office in June of this year, you indicated that you would proceed forthwith to obtain approval of the Bay Conservation and Development Commission and certification from the Regional Water Quality Control Board and apply for the necessary permit from this office. To date, there is no evidence of any progress in this respect. Accordingly, you are hereby ordered and directed to remove said unauthorized dikes and/or levees from the navigable waters of the United States within 90 days from the receipt hereof. Failure to do so will result in this office recommending legal action under Section 406 of Title 33, U. S. Code.

Sincerely yours,

CHARLES R. ROBERTS
Colonel, CE
District Engineer

Copy furnished:
Dana Murdock, Esq.
Financial Center Building
Locust & Bonanza St.
Walnut Creek, California 94597

Copy furnished:
Huggins

Wolfe

Hong

Frank Boone, Esq. Asst. U.S. Attorney

South Pacific Div.

DOCUMENT A-6

BCDC

A-18

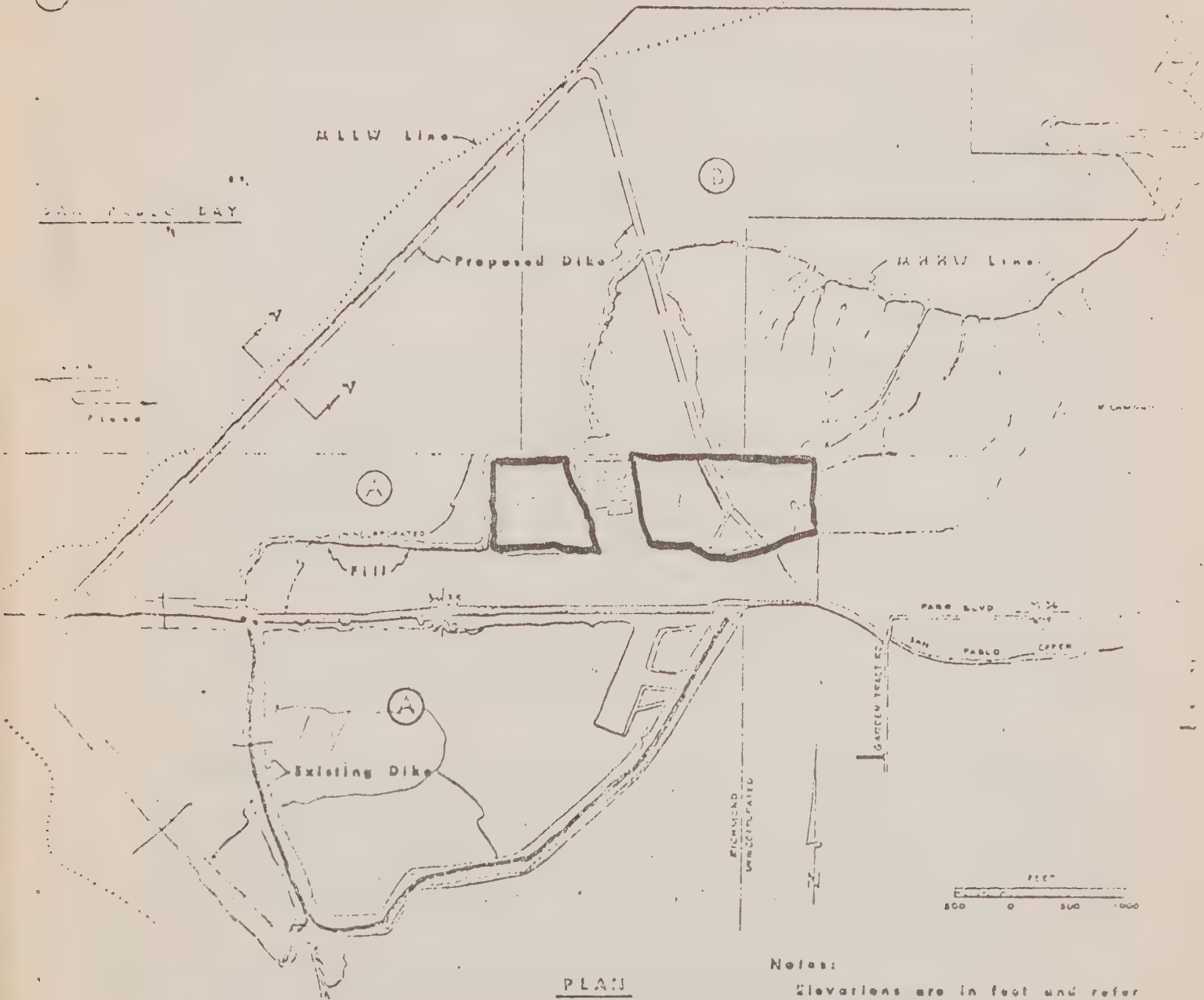
ATTACH. 2

Property Ownership:

Richmond Sanitary Service

Industrial Land Company

Prepared by: M. J. O'CONNELL & ASSOCIATES
From Aerial MAP 514, Clyde Sunderland
Situation as of 7-7-64

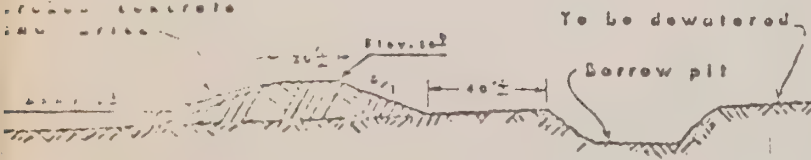


PLAN

Notes:

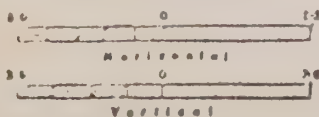
Elevations are in feet and refer to MLLW.
Harbor lines are not established.

Proposed dike to be
constructed with
crushed concrete
and rubble



Section AA of Dredged Dike

Scales of Feet



A-19

Proposed Dike
Around Tidolands in San Pablo Bay
Contra Costa County, California

Application by
Richmond Sanitary Service
Sheet 2 of 2

Oct. 10, 1964
Rev. 11-2-64

SPNCO-OW

10 January 1972

Mr. Richard Granzella
Richards Sanitary Service
1224 Kevin Avenue
Richmond, California 94801

Dear Mr. Granzella:

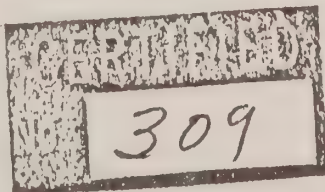
This is in reference to your fill operation in San Pablo Bay, Contra Costa County, California.

A site inspection on 15 September 1971, and an aerial surveillance on 29 November 1971, were made by personnel from this office. From the evidence obtained, it is apparent that large amounts of waste material are being placed in the area marked in red on the attached map. You did not obtain a permit from this office for such operations. Consequently, you are in violation of Section 403 of Title 33, U. S. Code.

You are hereby directed to discontinue at once the current filling operations in this area until you have obtained a Department of the Army permit. Failure to comply with the directive could result in prosecution as well as injunctive action in Federal Court.

In regard to the southwesterly dike and/or levees, the District Engineer, in his letter to you dated 13 October 1971, and received by you on 15 October 1971, ordered and directed you to remove within 30 days such southwesterly dikes and/or levees which you had constructed in navigable waters without a Corps permit. You have not started removal. You are requested to explain to this office by return mail, how you intend to comply with the removal order.

Sincerely yours,



1 Incl
As stated

Copies furnished:
David Hardock, Attorney
Frank Boone, Asst. U. S. Attorney
Alan Rendleton, CDC

JAMES C. WOLFE
Chief, Construction-
Operations Division

LAMM/dq
6-5178

SMITH
6-4478
HONG

THOMAS

WOLFE
JW
WOLFE

SPDCO SPNCO-OW (Lamm) SPNOC (Smith) SPNCO-OW (Hong) SPNCO Div Rdg File

KISTER, SAVIO & REI INC.

LAND SURVEYORS & CIVIL ENGINEERS

DONALD E. KISTER (1905-1969)

CHARLES J. SAVIO
LICENSED LAND SURVEYOR

MICHAEL P. REI
REGISTERED CIVIL ENGINEER

11818 SAN PABLO AVENUE

EL CERRITO, CALIF. 94530

TELEPHONE 234-7660

September 28, 1973

OCT 1

King & Delac

Richard Granzella
Richmond Sanitary Service
1224 Nevin Avenue
Richmond, California 94801

Dear Ritchie:

We have concluded our current studies concerning the capacity and useful life of the West Contra Costa Dump. We have analyzed both the physical holding capacity of the presently used 350 acre site, and the refuse to be generated by the area serviced by the site beyond the year 2020.

The results of our studies are indicated graphically on the attached chart, which shows the relationship between amount of fill received and the elevation of the top surface of the landfill at any particular point in time. Examples:

The red line shows that in the year 2020, 16.6 million tons will have been received, raising the elevation to 65 feet above MLLW.

The blue line shows that elevation 40 will be reached in the year 2002, with 9.1 million tons having been received.

Separate curves are shown indicating the effect of including or excluding Sausalito and Mill Valley after the year 1990.

In computing the amount of fill to be generated, the following factors were taken into account:

- 1) The present (1973) rate of fill is 228,800 tons per year, which breaks down to 800 tons per weekday, and 200 tons per day on Saturday and Sunday. These figures were developed considering such factors as number of trucks and truck capacity, past fill rates, accepted per capita disposal rates, and comparisons with other known dump site figures.
- 2) Population in the service area will increase as indicated by the figures on p. 14 of the "Refuse Disposal Plan", prepared by Contra Costa County, dated January 1973. 1970 Census figures for Sausalito and Mill Valley were added to the figures shown in the Plan.

- 3) Increase in per capita solid waste disposal was included at the rate of 1% per year, compounded.

In computing the physical capacity of the 350 acre site, the following factors were taken into account:

- 1) In-place density will be 1300 lbs. per cu. yd., in light of compaction methods now being used.
- 2) Outboard slopes of the finished fill will be at the ratio of 3 to 1 (horizontal to vertical).
- 3) The surface area of the fill, and hence the incremental volume, will decrease as the elevation of the surface increases.

I met today with Mr. Tom Meichtry of the Easley and Brassy Corporation. We reviewed our studies and figures in detail and he indicated to me that he will revise his report to reflect our conclusions.

Please let me know if we can be of further assistance.

Very truly yours,

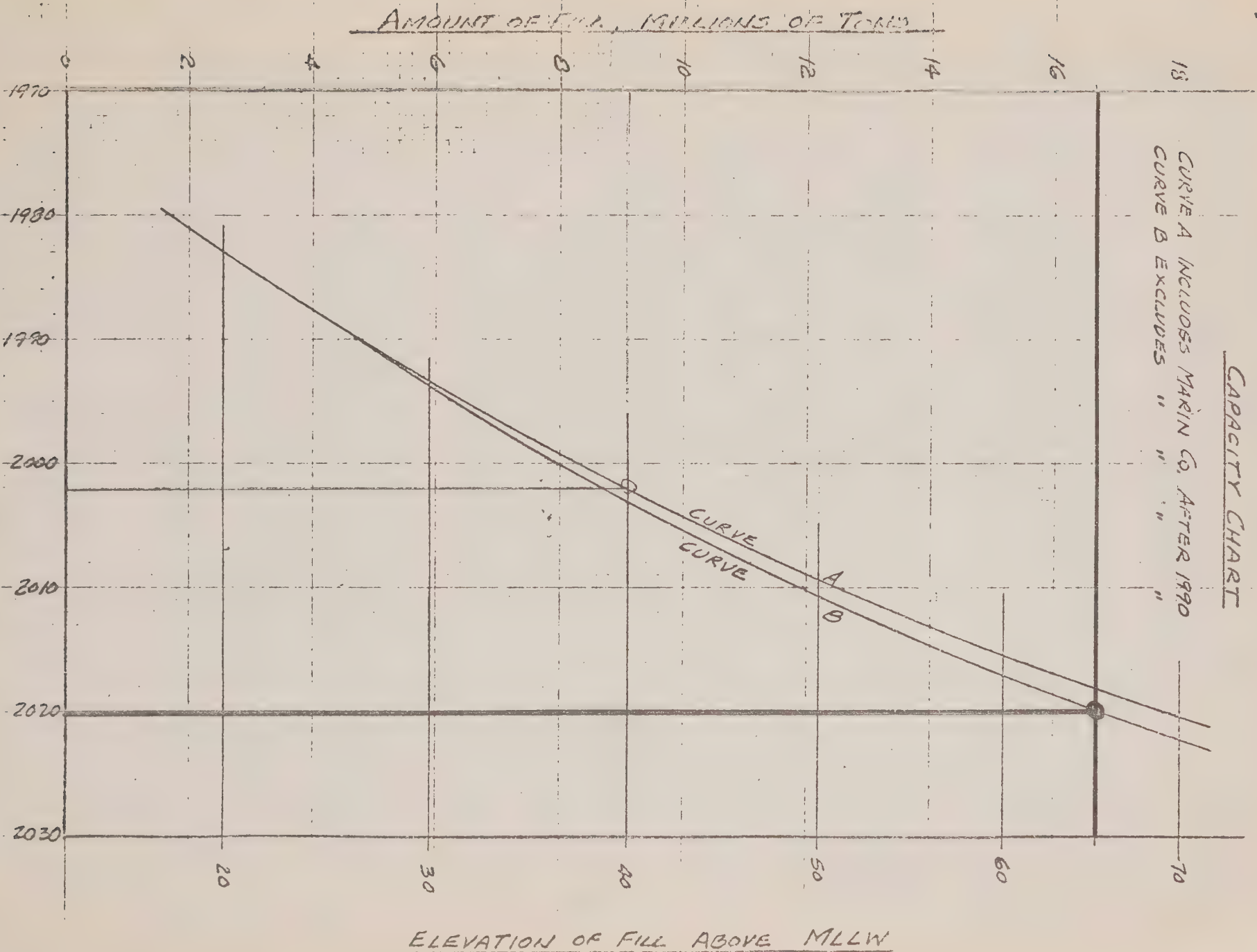


Michael P. Rei

MPR:bao
cc: Dana Murdock

WES: CONTRA COSTA COUNT DUMP CAPACITY CHART

CURVE A INCLUDES MARIN CO. AFTER 1990
 CURVE B EXCLUDES " " " "



U. S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS
100 McALLISTER STREET
SAN FRANCISCO, CALIFORNIA 94102

PUBLIC NOTICE NO. 74-0-48

TO WHOM IT MAY CONCERN:

2 October 1973

The Richmond Sanitary Service, c/o Tining & De Lap, Attorneys at Law, 1615 Bonanza Street, Walnut Creek, California 94597, has applied for a Department of the Army permit for existing levees and fill and proposed fill in San Pablo Bay at Richmond, Contra Costa County, California. The location of the site and details of the existing and proposed work are shown on the drawings that accompany this notice.

Sheet 1 shows the general site location. Sheet 2 shows the subject area as it exists at the present. Sheet 3 shows the total area on which additional fill would be placed. Also shown on this sheet are existing elevations, with the areas above mean higher high water (MHHW) differentiated from those below MHHW. A Corps of Engineers permit is required for all existing levees and fill shown on these sheets as well as for all future fill to be placed on areas which are presently below the level of mean higher high water. On sheet 4 are typical cross sections which show both the present elevations and the elevations which would exist after the proposed filling operations. Sheet 5, showing a possible future use of the area, is described in greater detail in a subsequent paragraph.

The applicant states that approximately 2,7000,000 cubic yards of fill have been placed upon an area of approximately 198 acres and that during the next 52 years an additional 9,000,000 cubic yards of fill would be placed upon a total of 350 acres within the site. The 9,000,000 cubic yards includes that fill which would be placed in the future on areas already partially filled.

The type of material in the proposed fill would be as follows:

- a. Garbage, rubbish and swill collected from householders.
- b. Commercial rubbish.
- c. Industrial materials, e.g., liquid wastes and barrel storage, etc.
- d. Demolition debris, tree and garden trimmings and miscellaneous material brought in by others, e.g., residents, etc.
- e. Clean fill used for covering of layers of refuse, facing of slopes and final grading for proper drainage.

The existing fill includes approximately the same types of materials. Sheet 3 shows the specific locations which the applicant states were used for industrial liquid waste disposals in the existing site and also the locations which would be used for such materials in the proposed fill.

Sheet 5 of the drawings was submitted by the applicant as a concept of a future park development plan for a much larger area on the west shore of Richmond. Certain parts of this plan, namely the golf course, marina, and equestrian center, would correspond approximately to the fill site described in this notice. However, the permit presently requested by the applicant would concern only the levees and fill and would not authorize any of the subsequent work required for the development of the park.

The applicant has applied to the California Regional Water Quality Control Board for the certificate required by the Federal Water Pollution Control Act Amendments of 1972 (PL 92-500), and to the San Francisco Bay Conservation and Development Commission for a permit authorizing the proposed work.

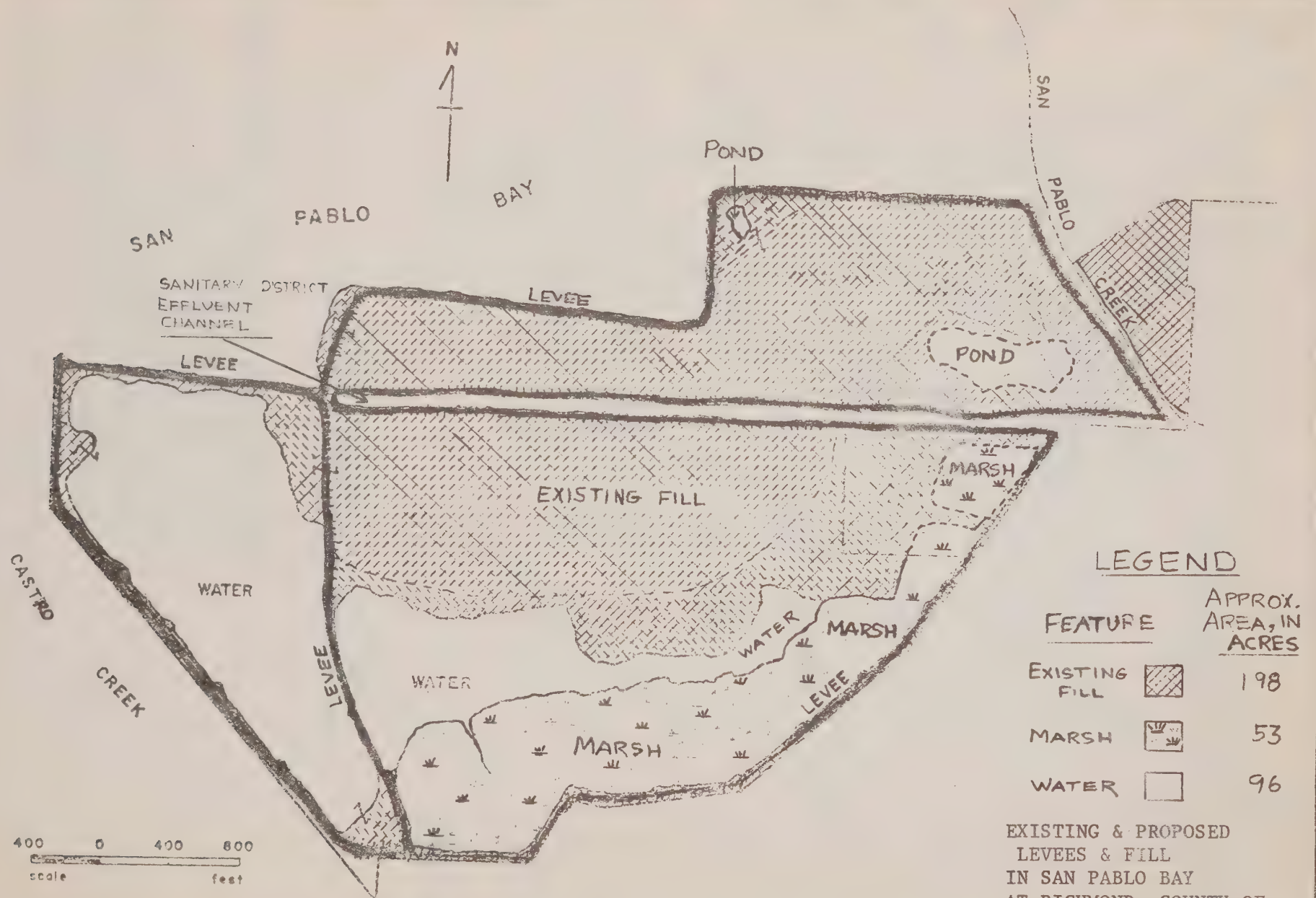
A permit issued by the Department of the Army does not give any property rights either in real estate or materials, or any exclusive privileges; and does not authorize any injury to private property or invasion of private rights, or any infringement of Federal, State, or local laws or regulations, nor does it obviate the necessity of obtaining State assent to the work authorized. The decision by the Corps of Engineers whether to issue a permit will be based on an evaluation of the probable impact of the proposed activity on the public interest. The decision will reflect the national concern for both protection and utilization of important resources. The benefits which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered; among those are conservation, economics, aesthetics, general environmental concerns, historic values, fish and wildlife values, flood damage prevention, land use classification, navigation, recreation, water supply, water quality and, in general, the needs and welfare of the people. No permit will be granted unless its issuance is found to be in the public interest.

It appears that the nature of the proposed project is such that the preparation of an Environmental Impact Statement (EIS) by the Corps of Engineers would be required before a decision could be made to issue the requested permit. The draft of this statement will be prepared for initial distribution on or about 15 October 1973.

Any person who has an interest which may be adversely affected by the issuance of a Corps of Engineers' permit for the work described in this notice may request a public hearing. The request must be submitted in writing to the District Engineer within thirty (30) days of date of this notice and must clearly set forth the interest which may be adversely affected by the activity.

Interested parties may also submit in writing any objections that they may have to the proposed work. Objections should be forwarded so as to reach this office not later than thirty (30) days from date of this notice.

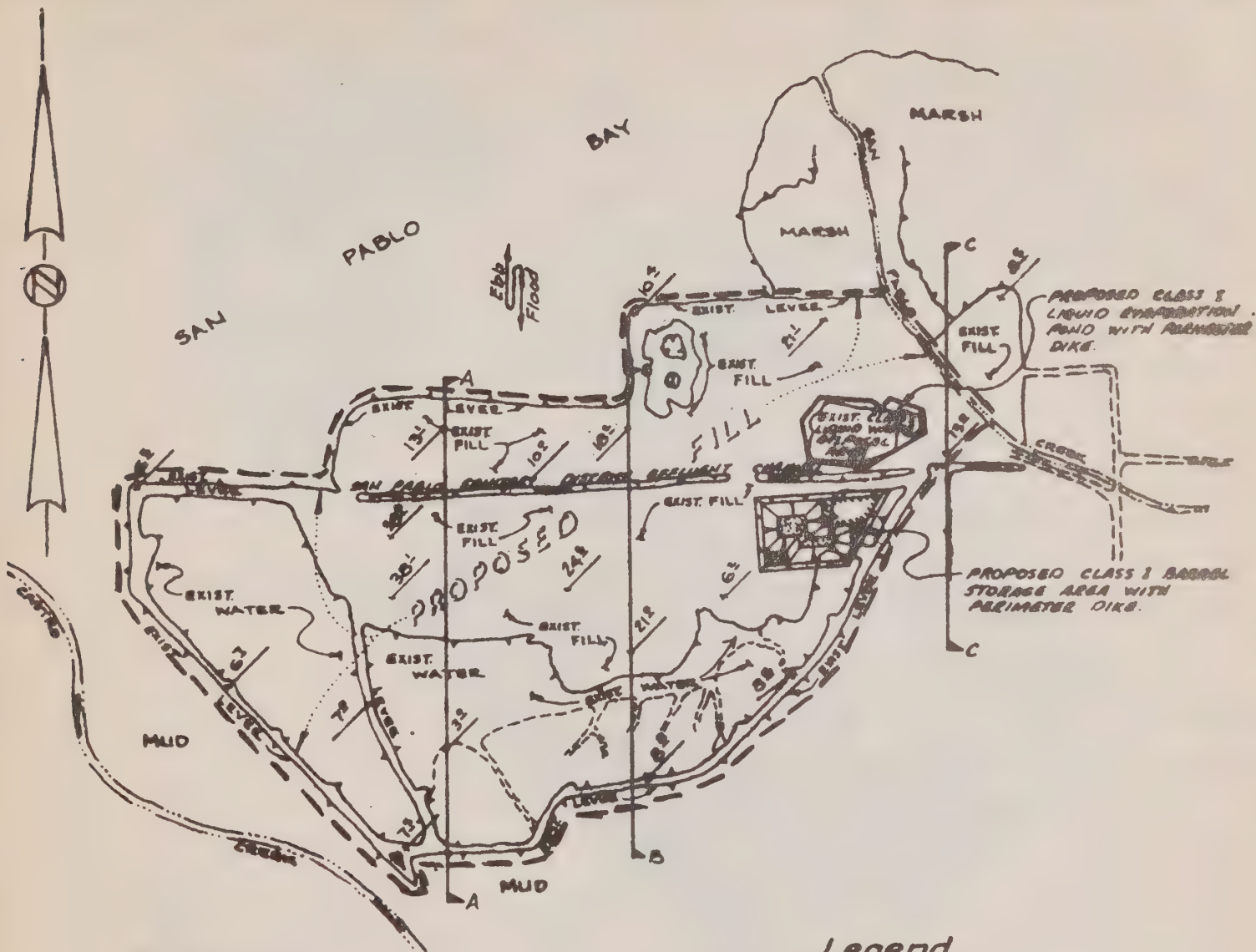
J. L. LAMMIE
Colonel, CE
District Engineer



LEGEND

| FEATURE | | APPROX. AREA, IN ACRES |
|---------------|--|------------------------|
| EXISTING FILL | | 198 |
| MARSH | | 53 |
| WATER | | 96 |

EXISTING & PROPOSED
LEVEES & FILL
IN SAN PABLO BAY
AT RICHMOND, COUNTY OF
CONTRA COSTA, CALIF.
APPLICATION BY RICHMOND
SANITARY SERVICE, 8-23-73



PLAN

SCALE

0 1,200' 2,000'

Legend

ABOVE MHHW
BELOW MHHW

MEAN HIGHER HIGH WATER LINE =
5.9 FT. MLLW DATUM

— — —

Fill proposed only for area
within dashed line

Elevations based on MLLW Datum.

Existing and Proposed Levees and Fill

in SAN PABLO BAY

at RICHMOND

County of CONTRA COSTA, State CALIF.

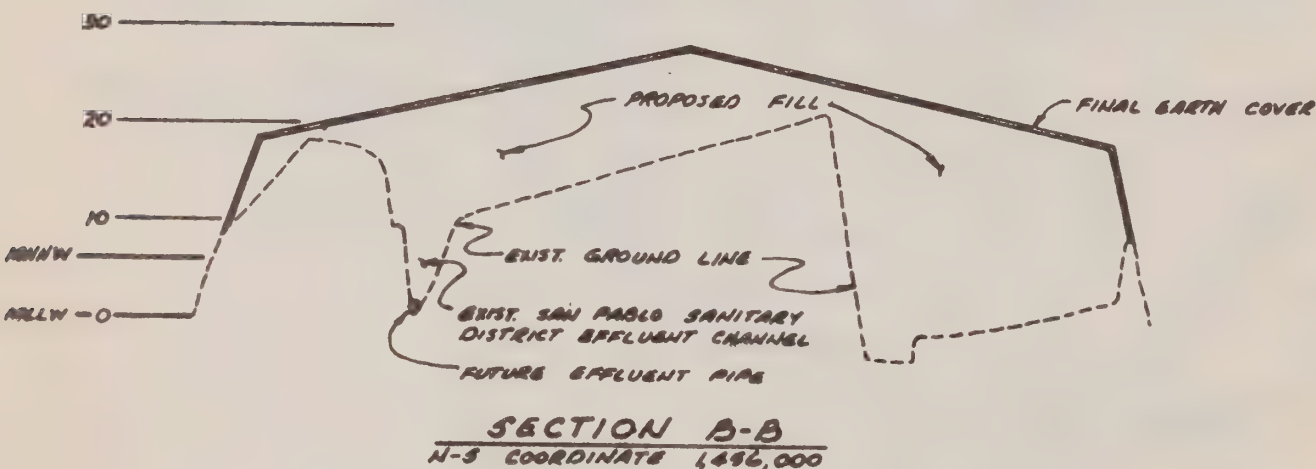
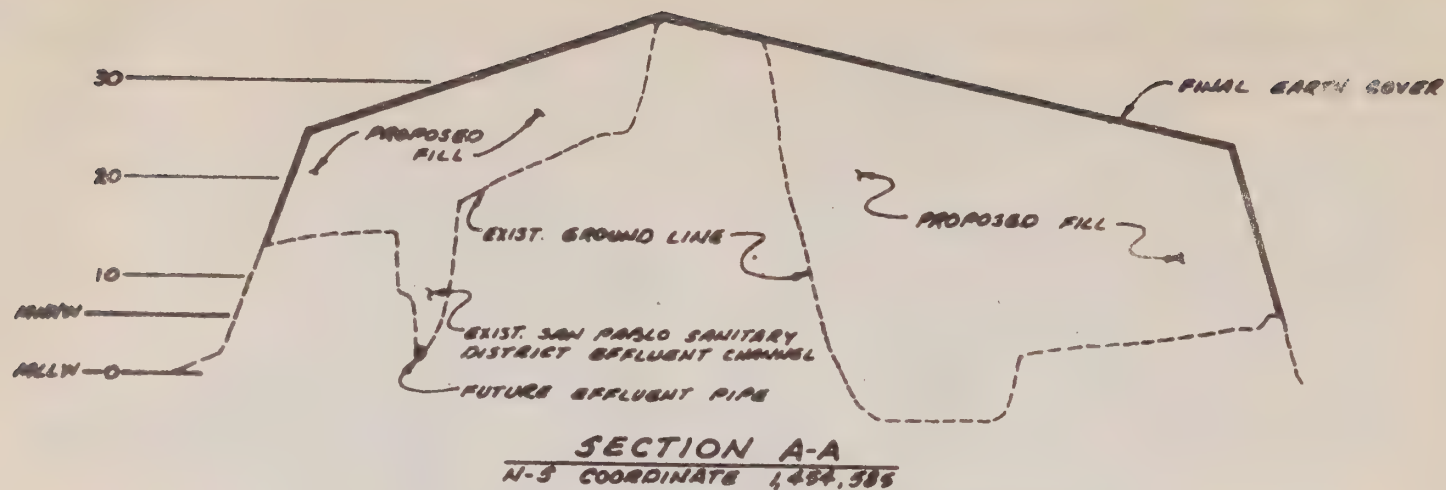
Application by RICHMOND SANITARY

SERVICE

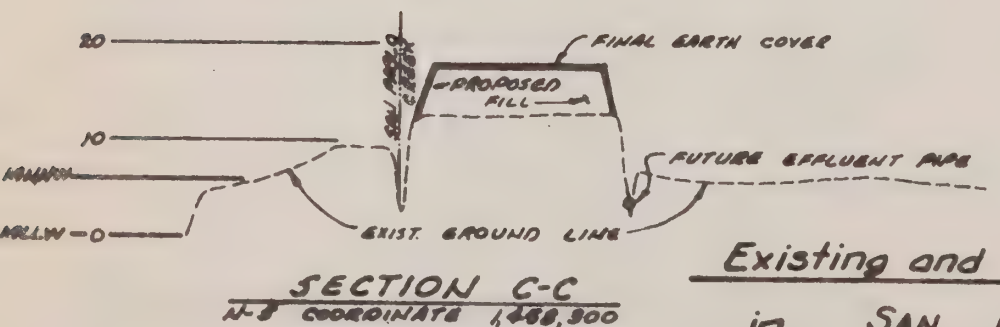
Date 12-13-72

REVISED 8-23-73

SHEET 3 OF 5



SCALE: HORIZ. - 1" = 600'
VERT. - 1" = 20'



Existing and Proposed Levees and Fill

in SAN PABLO BAY
of RICHMOND

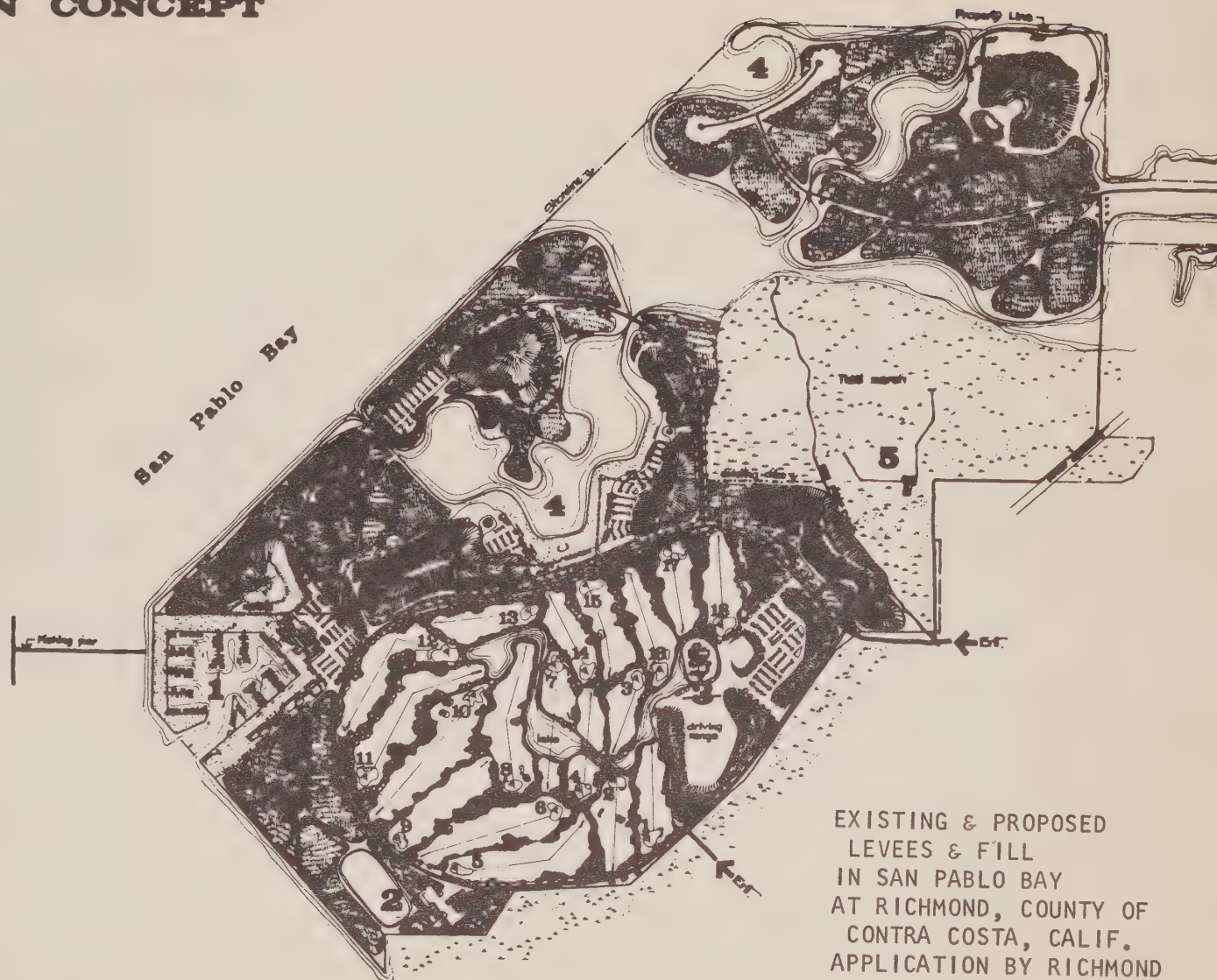
County of CONTRA COSTA, State CALIF.

Application by RICHMOND SANITARY
SERVICE

Date 12-13-72
REVISED 8-23-73

SAN PABLO BAY REGIONAL PARK DEVELOPMENT PLAN CONCEPT

- 1 MARINA
- 2 EQUESTRIAN CENTER
- 3 GOLF COURSE
- 4 SWIMMING BEACHES
- 5 OUTDOOR EDUCATION FACILITY
- 6 OUTDOOR BOWL



EXISTING & PROPOSED
LEVEES & FILL
IN SAN PABLO BAY
AT RICHMOND, COUNTY OF
CONTRA COSTA, CALIF.
APPLICATION BY RICHMOND
SANITARY SERVICE, 8-23-73



APPENDIX B

GUIDELINES FOR THE HANDLING OF HAZARDOUS WASTES

GUIDELINES FOR THE HANDLING OF
HAZARDOUS WASTES

CALIFORNIA DEPARTMENT OF HEALTH

June, 1974

HEADQUARTERS OFFICE: (916) 322-2337

Location: 1420 5th Street
Sacramento, CA 95814

Mailing: 744 P Street
Sacramento, CA 95814

BERKELEY OFFICE: (415) 843-7900, Extension 552

2151 Berkeley Way
Berkeley, CA 94709

LOS ANGELES OFFICE: (213) 620-2380

Location: 1449 Temple Street
Los Angeles, CA 90026

Mailing: P. O. Box 30327
Terminal Annex
Los Angeles, CA 90030

HAZARDOUS WASTE REPORTS

Pursuant to the attached regulations, all operators of disposal sites which receive hazardous waste shall submit monthly reports to the California State Department of Health, Vector Control Section, 714 P Street, Sacramento, California, 95814.

The reports shall include the following:

- (a) An accounting of fees collected for the disposal of hazardous wastes received.
- (b) Copies of all manifests (Liquid Waste Haulers Record) received which will include but need not be limited to, the type, quantity, and final disposal method of each hazardous waste received. If a deviation from the standard disposal procedure is necessary, a brief description of the deviation and the reason for such action shall be included.

The California Liquid Waste Hauler Record, see Appendix, as approved by the California State Water Resources Control Board, shall serve as the manifest as specified in Article 5, Chapter 2, of Title 22, California Administrative Code.

The generator of the hazardous waste must complete all applicable sections of the manifest prior to the transportation of the hazardous waste. In the event a hazardous waste is received at a disposal site without said form, the operator of the disposal site should maintain a supply of the forms and require the hauler to complete the form prior to disposal. The hazardous waste shall be identified as completely as possible. The chemical name is preferable, but the generic name may be used. The "proper shipping name" as required by the California Highway Patrol, should also be included.

HAZARDOUS WASTE FEES

The fees, based on the schedule noted below, will be paid on a monthly basis to the Director, State Department of Health. The fees will be forwarded to the following address:

Director, State Department of Health
Accounting Section
Hazardous Waste Control Account
714 P Street
Sacramento, California 95814

Fee schedule is as follows:

For liquids, slurries, sludges, and other hazardous materials, either bulk or containerized, a fee of one dollar (\$1.00) shall be collected for all loads of one (1) ton or less. For loads in excess of one (1) ton, a fee not to exceed sixty cents (\$0.60) per ton shall be collected, provided the total fee equals or exceeds one dollar (\$1.00).

In the event scales are not available at the processing facility or disposal site, an equivalent fee schedule may be levied based on volumetric measurements or other means as approved by the Department.

IDENTIFICATION OF HAZARDOUS WASTES

In determining whether a waste or waste mixture is hazardous or extremely hazardous, the following criteria should be considered. If the waste or waste mixture corresponds to any of the criteria, it may be hazardous or extremely hazardous and should be handled and disposed of accordingly.

- (a) The waste is designated on the California Liquid Waste Hauler Record (see Appendix) check-list as type 1 through 6, 9 through 11, 13, 15, 19, 23, or 24.
- (b) The waste is designated by generic name on the California Liquid Waste Hauler Record as one of the following:

Acid and water (corrosive)
Acid sludge (corrosive)
Alkaline caustic liquids (corrosive)
Alkaline cleaner (corrosive)
Alkaline corrosive battery fluid (corrosive)
Alkaline corrosive liquids (corrosive)
Asbestos waste (toxic)
Battery acid (corrosive)
Beryllium waste (toxic)
Catalyst (toxic)
Caustic wastewater (corrosive)
Chemical cleaners (corrosive or irritant)
Cleaning solvents (flammable)
Data processing fluid (flammable)
Electrolyte, acid (corrosive)
Etching acid liquid or solvent (corrosive)
Lime and water (corrosive or irritant)
Lime sludge (corrosive or irritant)
Lime wastewater (corrosive or irritant)
Liquid cement (flammable)
Liquid cleaning compounds (corrosive or irritant)
Obsolete explosives
Oil of bergamot and products containing 2 percent or more of
 oil of bergamot (strong sensitizer)
Paint (or varnish) remover or stripper (flammable)
Paint waste (or slops) - except water-based (flammable or toxic)
Petroleum waste (flammable)
Pickling liquor (corrosive)
Powdered orris root and products containing it (strong sensitizer)
Printing ink (flammable)
Refinery waste (flammable)
Retrograde explosives
Sludge acid (corrosive)
Solvents (flammable)
Spent acid (corrosive)
Spent caustic (corrosive)
Spent (or waste) cyanide solutions (toxic)
Spent mixed acid (corrosive)
Spent plating solution (toxic)
Spent sulfuric acid (corrosive)
Sulfonation oil (flammable)
Toxic chemical toilet wastes (toxic)
Toxic tank bottom (toxic)
Unrinsed pesticide containers (toxic)
Unwanted or waste pesticides - an unuseable portion of active
 ingredient or undiluted formulation (toxic)
Waste Chemicals - where the chemical is a substance like tetra-
 ethyl lead (toxic)
Waste epoxy (strong sensitizer)
Waste (or slop) oil (flammable)
Wyandotte cleaner (corrosive or irritant)

(c) The waste contains substances which are listed in Articles 2 and 3
of the attached regulations.

- (d) The waste contains substances which are known to be hazardous or extremely hazardous as defined respectively in Sections 25117 and 25115 of the attached hazardous waste law. For detailed information on the criteria see the Federal Register, Sept. 27, 1973, Vol. 38, No. 187, Part 11.

NONCOMPATIBLE WASTES

Many wastes when mixed with others at a disposal facility, can produce hazardous situations through heat generation, fires, explosions, or release of toxic substances. Below is a summary of potentially noncompatible waste materials and a list of guidelines in their handling and disposal.

List of Potentially Noncompatible Wastes

Group 1-A

Alkaline caustic liquids
Alkaline cleaner
Alkaline corrosive liquids
Alkaline corrosive battery fluid
Caustic wastewater
Lime sludge and other corrosive
alkalies
Lime wastewater
Lime and water
Spent caustic

Group 1-B

Acid sludge
Acid and water
Battery acid
Chemical cleaners
Electrolyte, acid
Etching acid liquid or solvent
Liquid cleaning compounds
Pickling liquor and other corrosive acids
Sludge acid
Spent acid
Spent mixed acid
Spent sulfuric acid

Potential consequences: Heat generation, violent reaction.

.

Group 2-A

Asbestos waste and other toxic
wastes
Beryllium wastes
Unrinsed pesticide containers
Waste pesticides

Group 2-B

Cleaning solvents
Data processing liquid
Obsolete explosives
Petroleum waste
Refinery waste
Retrograde explosives
Solvents
Waste oil and other flammable and
explosive wastes

Potential consequences: Release of toxic substances in case of fire or explosion.

.

Group 3-A

Aluminum
Beryllium
Calcium
Lithium
Magnesium
Potassium
Sodium
Zinc powder and other reactive
metals and metal hydrides

Group 3-B

Any waste in Group 1-A or 1-B

Potential consequences: Fire or explosion. Generation of flammable hydrogen gas.

.

Group 4-A

Alcohols
Water

Group 4-B

Any concentrated waste in Groups 1-A or 1-B
Calcium
Lithium
Metal hydrides
Potassium
Sodium
SO₂Cl₂, SOCl₂, PCl₃, CH₃SiCl₃, and
other water-reactive wastes

Potential consequences: Fire, explosion, or heat generation. Generation of flammable or toxic gasses.

.

Group 5-A

Alcohols
Aldehydes
Halogenated hydrocarbons
Nitrated hydrocarbons and other
reactive organic compounds
and solvents
Unsaturated hydrocarbons

Group 5-B

Concentrated Group 1-A or 1-B wastes
Group 3-A wastes

Potential consequences: Fire, explosion, or violent reaction.

.

Group 6-A

Spent cyanide solutions

Group 6-B

Group 1-B wastes

Potential consequences: Generation of toxic hydrogen cyanide gas.

.

Group 7-A

Chlorates and other strong
oxidizers
Chlorine
Chlorites
Chromic acid
Hypochlorites
Nitrates
Nitric acid, fuming
Perchlorates
Permanganates
Peroxides

Group 7-B

Acetic Acid and other organic acids
Concentrated mineral acids
Group 2-B wastes
Group 3-A wastes
Group 5-A wastes and other flammable
and combustible wastes.

Potential consequences: Fire, explosion, or violent reaction.

.

Guidelines for the Handling and Disposal of Noncompatible Wastes

1. Noncompatible wastes should not be mixed in the same transportation or storage container.
2. A waste should not be added to an unwashed transportation or storage container that previously contained a noncompatible waste.
3. Noncompatible wastes should not be combined in the same pond, landfill, soil-mixing area, well, or burial container. An exception is the controlled neutralization of acids and alkalies in disposal areas. Containers which hold noncompatible wastes should be well separated by soil or refuse when they are buried. Ideally, separate disposal areas should be maintained for noncompatible wastes.
4. Noncompatible wastes should not be incinerated together. An exception is the controlled incineration of pesticides and other toxic substances with flammable solvents.

These guidelines do not apply to any hazardous waste generator, transporter, or disposer or any person involved in hazardous waste management who combines hazardous wastes for neutralization, detoxification or experimental purposes providing that the lives and health of personnel involved and of the public

are protected by controlling volumes, flow rates, constraints, vessel configurations, temperatures, and vents during the process or experiment so that uncontrollable reaction, fire, explosion, heat generation, or release of toxic materials does not occur.

TECHNICAL CONSULTATION

Our technical staff will provide consultation involving the handling or disposal of hazardous and extremely hazardous materials, or on any other technical problem relating to hazardous wastes.

For assistance call any of the following persons:

Sacramento: Harvey F. Collins, Ph.D., P.E.
(916) 322-2337

Los Angeles Area: Earl Margitan, P.E.
(213) 620-2380

San Francisco Bay Area: Jeffrey Hahn
David Storm, Ph.D.
(415) 843-7900, Extension 552

STATE WATER RESOURCES CONTROL BOARD

PRODUCER OF LIQUID WASTE

Name (print or type): _____

Pick up Address _____
(Number) (Street) (City)

Type of process which produced wastes: _____
(Examples: metal plating, equipment cleaning, chemical formulation, etc.)

WASTE TYPE OF LIQUID WASTE:

Quantity
(Circle one)
gallons or barrels

- Acid Solution ☐ _____
- Alkaline Solution ☐ _____
- Pesticides ☐ _____
- Etching Solution ☐ _____
- Solvent Plating Solution ☐ _____
- Catalyst ☐ _____
- Brine ☐ _____
- Emulsion ☐ _____
- Tetra Ethyl Lead Sludge ☐ _____
- Toxic Tank Bottom Sediment ☐ _____
- Other Toxic Solutions: ☐ _____
(Name): _____

HAULER

Name (print or type) _____

Business Address _____
(Number) (Street) (City)

I certify that the described waste was hauled by me in a vehicle with a valid liquid waste hauler registration certificate to the disposal facility named below and was accepted

State Waste Hauler's Registration No.: _____

Local Business License Truck Tag No. (if applicable): _____

Signature of Producer or Authorized Agent and Title _____

Signature of Hauler or Authorized Agent and Title _____

DISPOSAL FACILITY

Name (print or type) _____

Site Address _____

I certify that the hauler above delivered the described liquid waste to this disposal facility and it was an acceptable material under the terms of the RWQCB Discharge Requirements and local regulations

Site Operator shall indicate identification code for the manner and location of Group 1 Waste Disposal at the Facility: (The listing of identification code is only required for Group 1 Waste Disposal. Instructions on how to specify this code have been forwarded to each Class I and Class II-1 disposal site in California.)

Treatment or Recovery Process _____ Pond _____ Spreading Area _____ Landfill Area _____ Other _____

IF WASTE IS HELD FOR DISPOSAL ELSEWHERE,
SPECIFY FINAL LOCATION _____

Signature of Waste Disposal Facility Operator or Authorized Agent and Title _____

*FAILURE TO MAINTAIN RECORDS AS REQUIRED BY SECTION 2440 OF CHAPTER 3, TITLE 23 OF THE CALIFORNIA ADMINISTRATIVE CODE, MAY RESULT IN REVOCATION OF REGISTRATION.

- Chemical Fertilizer ☐ _____
- Chemical Toilet Wastes ☐ _____
- Cannery Waste ☐ _____
- Oil ☐ _____
- Grease ☐ _____
- Non-toxic Rotary Drilling Mud ☐ _____
- Acetylene Sludge ☐ _____
- Paint Sludge ☐ _____
- Asphalt Sludge ☐ _____
- Latex Waste ☐ _____
- Tile Glaze Waste ☐ _____
- Lime Soda Water ☐ _____
- Solvent ☐ _____
- Non-toxic Mud and Water ☐ _____
- Other Non-toxic Solutions: (Name) ☐ _____

APPENDIX C

SELECTED SECTIONS - CALIFORNIA ADMINISTRATIVE CODE,
TITLE 23, CHAPTER 3, SUBCHAPTER 15
WASTE DISPOSAL TO LAND

SELECTED SECTIONS - CALIFORNIA ADMINISTRATIVE CODE,
TITLE 23, CHAPTER 3, SUBCHAPTER 15
WASTE DISPOSAL TO LAND

Article 1. General Provisions

2500. Definition of Terms

2500(a) "Disposal site" means any place used for the disposal of solid or liquid wastes. It does not include any part of a sewage treatment plant or point of discharge of sewage effluent or land drainage from pipes or ditches into waters of the state.

2500(b) "Disposal area" is that portion of the site which has received or is receiving wastes.

2500(c) "Leachate" is drainage from the waste or fluid resulting from the percolation of liquid through a waste substance.

2500(d) "Usable" ground or surface water includes potentially usable water.

2500(e) "Hydraulic continuity" is a condition existing when fluid occupying an interstice of a saturated material is able to move under a head differential to adjoining interstices or surface channels containing fluid.

2500(f) "Capillary fringe" is the partly saturated zone immediately above the water table in which water is held by capillary forces.

2500(g) "Toxic" means lethal, injurious, or damaging to man or other living organisms including plants, domestic animals, fish and wildlife.

2500(h) "Active life" is the period of time required to achieve stabilization of decomposing waste in a site such that leachate or the rate of generation of gases is no longer a threat to water quality.

Article 2. Classification of Waste Disposal Sites

2510. Class I Disposal Sites. Class I disposal sites are those at which complete protection is provided for all time for the quality of ground and surface waters from all wastes deposited therein and against hazard to public health and wildlife resources.

The following criteria must be met to qualify a site as Class I:

2510(a) Geological conditions are naturally capable of preventing vertical hydraulic continuity between liquids and gases emanating from the waste in the site and usable surface or groundwaters.

2510(b) Geological conditions are naturally capable of preventing lateral hydraulic continuity between liquids and gases emanating from wastes in the site and usable surface or groundwaters, or the disposal area has been modified to achieve such capability.

2510(c) Underlying geological formations which contain rock fractures or fissures of questionable permeability must be permanently sealed to provide a competent barrier to the movement of liquids or gases from the disposal site to usable water.

2510(d) Inundation of disposal areas shall not occur until the site is closed in accordance with requirements of the regional board.

2510(e) Disposal areas shall not be subject to washout.

2510(f) Leachate and subsurface flow into the disposal area shall be contained within the site unless other disposition is made in accordance with requirements of the regional board.

2510(g) Sites shall not be located over zones of active faulting or where other forms of geological change would impair the competence of natural features or artificial barriers which prevent continuity with usable waters.

2510(h) Sites made suitable for use by man-made physical barriers shall not be located where improper operation or maintenance of such structures could permit the waste, leachate, or gases to contact usable ground or surface water.

2510(i) Sites which comply with a, b, c, e, f, and g, but would be subject to inundation by a tide or a flood of greater than 100-year frequency may be considered by the regional board as a limited Class I disposal site.

2511. Class II Disposal Sites. Class II disposal sites are those at which protection is provided to water quality from Group 2 and Group 3 wastes. The types of physical features and the extent of protection of groundwater quality divides Class II sites into the two following categories:

Class II-1 sites are those overlying usable groundwater and geologic conditions are either naturally capable of preventing lateral and vertical hydraulic continuity between liquids and gases emanating from the waste in the site and usable surface or groundwaters, or the disposal area has been modified to achieve such capability.

Class II-2 sites are those having vertical and lateral hydraulic continuity with usable groundwater but for which geological and hydraulic features such as soil type, artificial barriers, depth to groundwater, and other factors will assure protection of the quality of usable groundwater underneath or adjacent to the site.

The following criteria must be met to qualify a site as Class II:

2511(a) Disposal areas shall be protected by natural or artificial features so as to assure protection from any washout and from inundation which could occur as a result of tides or floods having a predicted frequency of once in 100 years.

2511(b) Surface drainage from tributary areas shall not contact Group 2 wastes in the site during disposal operations and for the active life of the site.

2511(c) Gases and leachate emanating from waste in the site shall not unreasonably affect groundwater during the active life of the site.

2511(d) Subsurface flow into the site and the depth at which water soluble materials are placed shall be controlled during construction and operation of the site to minimize leachate production and assure that the Group 2 waste material will be above the highest anticipated elevation of the capillary fringe of the groundwater. Discharge from the site shall be subject to waste discharge requirements.

2512. Class III Disposal Sites. Class III disposal sites are those at which protection is provided to water quality from Group 3 wastes by location, construction, and operation which prevent erosion of deposited material.

2520. Group 1 Wastes. Group 1 wastes consist of or contain toxic substances as defined in Section 2500 and substances which could significantly impair the quality of usable waters. Examples include but are not limited to the following:

2520(a) Municipal origin

1. Saline fluids from water or waste treatment and reclamation processes.
2. Community incinerator ashes.
3. Toxic chemical toilet wastes.

2520(b) Industrial origin

1. Brines from food processing, oil well production, water treatment, industrial processes, and geothermal plants.
2. Other toxic or hazardous fluids from industrial operations such as spent cleaning fluids, petroleum fractions, chemicals, acids, alkalies, phenols, and spent washing fluids.
3. Substances from which toxic materials can leach such as process ashes, chemical mixtures, and mine tailings.
4. Rotary drilling muds containing toxic materials.

2520(c) Agricultural origin

1. Chemicals such as pesticides or chemical fertilizers.
2. Discarded containers of chemicals unless adequately cleansed.

2520(d) Other toxic wastes such as compounds of arsenic or mercury or chemical warfare agents.

2521. Group 2 Wastes. Group 2 wastes consist of or contain chemically or

biologically decomposable material which does not include toxic substances nor those capable of significantly impairing the quality of usable waters. Examples include but are not limited to the following:

2521(a) Municipal and industrial origin.

1. Garbage from handling, preparation, processing or serving of food or food products.

2. Rubbish such as paper, cardboard, tin cans, cloth, glass, etc.

3. Construction and demolition materials such as paper, cardboard, wood, metal, glass, rubber products, roofing paper, and wallpaper.

4. Street refuse such as sweepings, dirt, leaves, catch basin cleanings, litter, yard clippings, glass, paper, wood and metals.

5. Dead animals and portions thereof.

6. Abandoned vehicles.

7. Sewage treatment residue such as solids from screens and grit chambers, dewatered sludge, and septic tank pumpings.

8. Water treatment residue such as solid organic matter collected on screens and in settling tanks.

9. Ashes from household burning.

10. Infectious materials and hospital or laboratory wastes authorized for disposal to land by official agencies charged with control of plant, animal, or human disease.

11. Magnesium and other highly flammable or pyrophoric materials.

2521(b) Agricultural origin.

1. Plant residues from the production of crops including, but not limited to, stalks, vines, green drops, culls, stubble, hulls, lint, seed,

roots, stumps, prunings, and trimmings.

2. Manures.

3. Dead animals or portions thereof.

4. Adequately cleansed pesticide containers.

2522. Group 3 Wastes. Group 3 wastes consist entirely of non-water soluble, nondecomposable inert solids, examples include but are not limited to the following:

2522(a) Construction and demolition wastes such as earth, rock, concrete, asphalt paving fragments, inert plastics, plasterboard, and demolition material containing minor amounts of wood and metals.

2522(b) Vehicle tires.

2522(c) Industrial wastes such as clay products, glass, inert slags, asbestos, inert tailings, inert tailings, inert rubber scrap and inert plastics.

APPENDIX D

SANITARY LANDFILL OPERATION GUIDELINES

APPENDIX D

SANITARY LANDFILL OPERATION GUIDELINES

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CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 73-40

WASTE DISCHARGE REQUIREMENTS
FOR
RICHMOND SANITARY SERVICE AND
INDUSTRIAL LAND COMPANY
CONTRA COSTA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region finds that:

1. Richmond Sanitary Service submitted a report of waste discharge, dated May 6, 1971 and other engineering reports as described below:
 - a. Soils Engineering Studies, by Cooper-Clark and Associates, dated December 28, 1971.
 - b. Final Location and Design Studies, Existing and Proposed Class 1 Disposal Areas, by Cooper-Clark and Associates, dated April 27, 1972.
 - c. Supplementary Subsurface Explorations and suggested Construction and Operation Specifications, by Cooper-Clark and Associates, dated August 28, 1972.
 - d. Supplementary Consultation Re: Disposal of Empty and Partially Empty Containers Formerly Containing Group I Materials, by Cooper-Clark and Associates, dated May 2, 1972.
 - e. Consultation Re: Interim Remedial Measures, Existing Class 2 Disposal Areas, by Cooper-Clark and Associates, dated August 30, 1972.
2. Existing waste discharge requirements were prescribed by this Regional Board in Resolution No. 569, adopted on July 16, 1964.
3. Richmond Sanitary Service operates the West Contra Costa County Dump at the foot of Parr Boulevard in the City of Richmond. The report of waste discharge delineates the disposal site as comprising approximately 890 acres of marshland, tidelands and bay fill as shown on Attachment A, incorporated herein and made a part of this order. Ownership is claimed by Richmond Sanitary Service and Industrial Land Company, collectively called the discharger below.
4. The 890-acre site includes:
 - a. Approximately 350 acres presently behind dikes on the southern portion of the site, about 50% of which presently contains waste material. These areas are shown as II_A, II_B, II_C, I_P, and I_B on Attachment A.
 - b. Approximately 540 acres on the northern portion of the site, presently undiked and not containing waste material. This area is shown as II_D on Attachment A.

5. San Pablo Sanitary District's effluent channel and San Pablo Creek traverse the site. San Pablo Creek drains an area extending approximately 15 miles inland and is dammed at a point approximately 7 miles inland to form San Pablo Reservoir.
6. The Army Corps of Engineers has filed a complaint in U. S. District court requesting an injunction against further filling within navigable waters of San Pablo Bay and requesting removal of the westerly dike bounding area II_B and the westerly and northerly dikes bounding area II_C.
7. Richmond Sanitary Service and Industrial Land Company have filed permit applications with the United States Army Corp of Engineers and the Bay Conservation and Development Commission covering areas II_A, II_B, II_C, I_P, and I_B. No such applications have been filed for area II_D.
8. The diking and filling of area II_D, the filling of areas I_B, II_B, and II_C, and the construction of facilities necessary to comply with discharge specifications below will have significant environmental impact.
9. The waste discharged at the disposal site consists of:
 - WASTE A: Liquid industrial wastes, sludges and other Group I waste as defined in Section 2520, Title 23 of the California Administrative Code including: refinery and petroleum wastes, acid plating solutions, tetra-ethyl lead sludge, solvents, waste chemicals, etc. Approximately one million gallons were discharged in 1971.
 - WASTE B: Unrinsed pesticide and chemical containers such as cans, bags and fiber drums, and their contents. These are Group I wastes.
 - WASTE C: Household and commercial refuse, garbage, trash, demolition debris, etc. Approximately 120,000 tons or 200,000 to 250,000 cubic yards are discharged annually. These are Group 2 and 3 wastes.
10. Disposal areas for Group I wastes, as proposed, will consist of a 9-acre diked pond for liquids and a 10-acre, excavated, diked area for barreled wastes and Waste B. These are identified as I_P and I_B respectively on Attachment A and below.
11. WASTE C is proposed to be discharged to the remaining areas of the site, identified as II_A, II_B, II_C, and II_D on Attachment A and below.
12. Limited groundwater resources underlie the disposal site. Conditions exist which appear to preclude waste migration to usable groundwater. These conditions include (a) an extensive thickness of low-permeability sediments including the bay mud, and (b) groundwater occurs under confined conditions and an upward direction of flow movement exists. Decreasing use is being made of groundwater in the surrounding area due to low well yields and the availability of public water supply systems.
13. Upon completion of proposed barriers and containment structures, as described in the reports cited under finding 1, page 1, and such modifications as approved by the Executive Officer, proposed Group I disposal areas will meet the criteria contained in the California Administrative Code, Title 23, Chapter 3, Subchapter 15, for classification as follows:

Barrel disposal area, I_B - Limited Class 1, suitable for disposal of barreled Group I wastes and Group I waste containers.

Disposal pond, I_P - Limited Class I, suitable for disposal of Group I wastes.

14. Upon completion of barriers and containment structures, of an adequate and presently undetermined design, approved by the Executive Officer, areas II_A, II_B and II_C will meet the criteria contained in the California Administrative Code, Title 23, Chapter 3, Subchapter 15 for classification as Class II-2, suitable for disposal of Group 2 and 3 waste.
15. The beneficial water uses of San Pablo Bay and San Pablo Creek include:
 - Industrial cooling water supply year-round
 - Swimming, water-skiing, pleasure boating, marinas, fishing and hunting;
 - Fish and wildlife propagation and sustenance, and water fowl and other migratory birds habitat and resting;
 - Esthetic enjoyment.
16. The Board adopted an Interim Water Quality Control Plan for the San Francisco Bay Basin on June 14, 1971, and this order implements the water quality objectives stated in that plan.
17. The Board has notified the discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for this proposed discharge.
18. The Board in a public meeting heard and considered all comments pertaining to the proposed discharge.

IT IS HEREBY ORDERED THAT, Richmond Sanitary Service, Industrial Land Company and any other person who operates this site shall comply with the following:

A. Discharge Specifications

1. The treatment or disposal of waste shall not create a nuisance.
2. Group I wastes shall be confined to disposal areas I_P and I_B at all times. These wastes, or any water that has contacted the waste, shall not be discharged from these disposal areas to surface waters or groundwaters of the State.
3. Liquid or solid accumulations within disposal areas I_P and I_B shall not be discharged into waters of the State nor onto Group 2 disposal areas of the disposal site.
4. Disposal areas I_P and I_B shall not be subject to inundation or wash-out by tidal or flood waters.
5. The elevation of free liquid within the disposal area I_B shall be maintained a minimum of 3 feet below the working level. The maximum elevation shall be maintained a minimum of 2 feet below the lowest ultimate elevation of the top of the surrounding impervious dike.

6. Each layer of barrels placed within the disposal area I_B shall be covered with a minimum of 1 foot of compacted soil. Incorporation of empty bags and fiber drums used for Group 1 waste into this soil cover is permissible.
7. A natural clay barrier of at least 5 feet in thickness shall be present on the bottom and sides of disposal areas I_B and I_P . These barriers shall have permeability of at least 10^{-8} cm/sec for lateral leachate control (side barriers) and at least 10^{-7} cm/sec for vertical leachate control (bottom barrier). If such a condition does not exist, an artificial barrier shall be constructed to meet the above specifications.
8. A minimum freeboard of 2 feet shall be maintained in disposal pond I_P at all times.
9. Excavations in disposal area I_B shall not extend below -10 feet MSL Datum.
10. Group 2 wastes shall be confined to disposal areas II_A , II_B , or II_C at all times and shall not be placed in any position where it can be carried from the disposal sites and discharged into waters of the State.
11. Decomposable waste material shall not be placed in water or allowed to come in contact with pools of surface water.
12. Disposal areas II_A , II_B , and II_C shall be adequately protected from washout or erosion of wastes or covering material, and from inundation. Adequate protection is defined as protection from a flood having a predicted frequency of once in 100 years and the maximum high tide of record.

Annually, prior to anticipated rainfall, all necessary surface drainage control measures shall be taken to prevent erosion or flooding of the site.
13. Leachate from Group 2 waste or ponded water containing leachate shall not be discharged to waters of the State. Water used during disposal site operations shall be limited to a minimal amount reasonably necessary for dust control purposes.
14. Exterior surfaces of completed portions of disposal areas II_A , II_B , and II_C shall be covered and graded to properly drain all rainwater and prevent ponding.
15. The migration of methane gas from Group 2 waste shall be controlled as necessary to prevent creation of a nuisance.
16. Liquid wastes or high moisture content waste shall not be discharged with Group 2 waste, except at the expressed, written approval of the Executive Officer.

B. Discharge Prohibitions

1. The discharge of waste to area II_D is prohibited subject to provision C.1. below.

2. Notwithstanding the discharge specifications above, the discharge of waste to areas I_B, II_B, and II_C is prohibited, subject to provision C.2 below.
3. The discharge of uncontainerized Group 1 wastes in area I_B is prohibited.

C. Provisions

1. This Board will consider adoption of waste discharge requirements for area II_D subsequent to submittal and consideration by this Board of an adequate environmental impact report and filing of a permit application to the Bay Conservation and Development Commission.
2. The discharge of waste in areas I_B, II_B, and II_C shall not commence until after submittal and consideration by this Board of an adequate environmental impact report and until the Executive Officer agrees in writing that the measures necessary to meet waste discharge requirements have been taken and a self-monitoring program has been agreed to and a permit application has been filed with the Bay Conservation and Development Commission. Not less than 30 days prior to commencing initial disposal operations, the discharger shall submit to this Board's Executive Officer for approval, plans and specifications describing the site preparation, construction and filling procedures and sequence. Sufficient exploratory evidence, from borings or approved geophysical techniques, shall be submitted concurrently to demonstrate compliance with specifications. Upon completion of construction a signed certification shall be submitted to the Board by a registered engineer or certified engineering geologist certifying that the construction has been accomplished according to approved plans and specifications.
3. The discharger shall submit a report on area I_P by July 15, 1973 which presents:
 - a. A detailed plan for modifying the disposal facilities, as described in the report cited under finding 1.b above or as approved by the Executive Officer, in order to comply with the above discharge specifications and a time schedule for undertaking such improvements.
 - b. An operations manual to be used as a guide for site personnel responsible for the operation of this area.
 - c. A program to prevent wildlife from being attracted to or alighting upon area I_P.

Upon completion of construction a signed certification shall be submitted to the Board by a registered engineer or certified engineering geologist certifying that the construction has been accomplished according to approved plans and specifications.

4. The discharger shall undertake interim improvements for area II_A, as described in the report cited under finding 1.e above or as approved by the Executive Officer, by September 30, 1973. A detailed plan, supported by all necessary engineering studies, for improvements to area II_A for compliance with all discharge specifications of this order, shall be submitted within 60 days of final action relative to the matters referenced under findings 6 and 7 above.

5. The discharger shall file with the Regional Board (for areas I_B and I_P, 30 days prior to disposal in I_B and for the remaining areas of the site, 30 days prior to disposal in areas II_B or II_C), a written commitment and plan in a form satisfactory to the Board which will provide the necessary monetary reserve for such monitoring, maintenance and repair as may be necessary to protect water quality according to these requirements in the event this waste disposal site is transferred at any time, by fee or otherwise, out of the control of the discharger.
6. At regular intervals to be established by the Surveillance Section of this Board, the Richmond Sanitary Service shall submit reports and supporting data prepared by a registered civil engineer or a certified engineering geologist certifying compliance with the submitted construction plans and specifications.
7. Richmond Sanitary Service shall maintain a copy of this order at the site so as to be available at all times to site operating personnel.
8. Richmond Sanitary Service shall file with this Board a report of any material change or proposed change in the character, location or quantity of this waste discharge. For the purpose of these requirements, this includes any proposed change in the boundaries, method of operation, contours or ownership of the disposal area(s).
9. Richmond Sanitary Service shall file a written report within 90 days after the total quantity of wastes discharged at this site equals 75 percent of the reported capacity of the site. The report shall contain a schedule for studies, design and other steps needed to provide additional capacity.
10. Ninety (90) days prior to discontinuing use of any major phase or unit of this site for waste disposal, the Richmond Sanitary Service shall submit a technical report to the Board describing the methods and controls used to assure protection of the quality of surface and groundwaters of the area during final operations and during any subsequent use of the land. This report shall be prepared by or under the supervision of a registered engineer or a certified engineering geologist. The method used to close the site and maintain protection of the quality of the surface and groundwaters shall comply with waste discharge requirements established by the Regional Board.
11. Richmond Sanitary Service shall maintain a legible record using a reporting form indicated by the Board of the volume and type of each Group I waste received at the site and the manner and location of disposal. The record shall be maintained for a period of not less than ten years, with the records to be forwarded to the Board if disposal operations cease.
12. Richmond Sanitary Service shall take note of all recommendations of the State Department of Public Health, Bureau of Vector Control and Solid Waste Management and the Contra Costa County Health Department, regarding disposal of hazardous wastes and shall take all precautions in the design and operation of disposal facilities to minimize the risk of injury to operating personnel.

13. The property owner shall have a continuing responsibility for correcting any problems which may arise in the future as a result of this waste discharge.
14. This order includes items Nos. 1, 2, 3, 5, and 6 of the attached "Notifications" dated January 6, 1970.
15. This order includes items Nos. 1 and 6 of the attached "Reporting Requirements" dated September 11, 1972.
16. This Board's Resolution No. 569 is hereby rescinded.

I, Fred H. Dierker, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region on June 26, 1973.

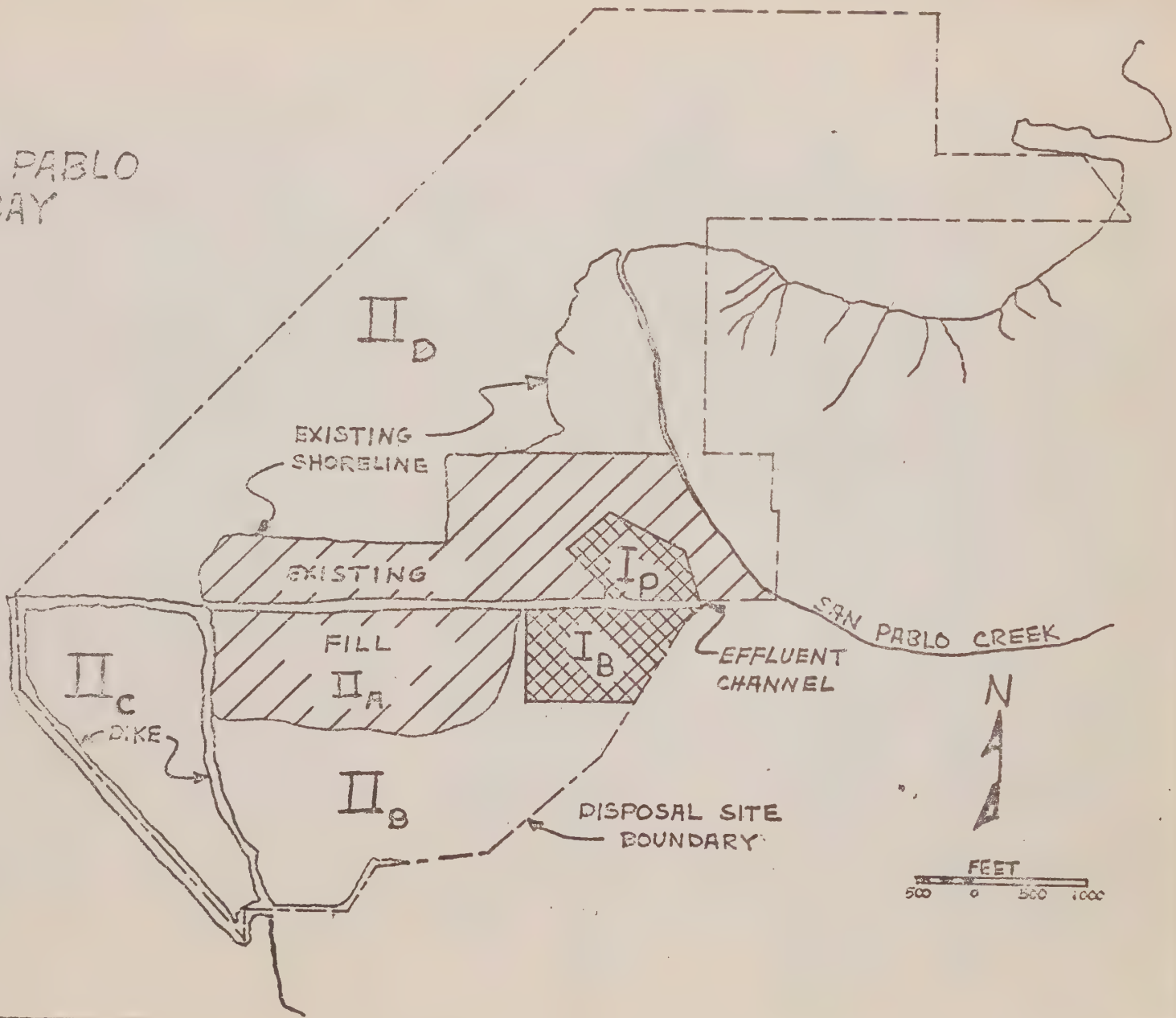


FRED H. DIERKER
Executive Officer

Attachments: Drawing 3/23/73
Notifications 1/6/70
Reporting Requirements 9/11/72
Letter 6/12/73 of CCCo. Health Dept.
Memo 6/8/73 of Dept. of Fish and Game

ATTACHMENT A
ORDER NO. 73-40

SAN PABLO BAY



STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

RICHMOND SANITARY
SERVICE
RICHMOND, CAL.

DRAWN BY: D.D. DATE: 12/1/73 DRWG NO.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

January 6, 1970

NOTIFICATIONS

1. This Board requests the discharger to take note of the comments and recommendations contained in all the correspondence the Board has received and considered concerning this matter, and the Executive Officer is directed to transmit copies of that correspondence to the discharger.
2. This Board considers "Waters of the State" as defined in Section 13050(e) of the California Water Code to include waste waters over which the discharger has lost control.
3. The requirements prescribed herein do not authorize the commission of any act causing injury to the property of another, nor protect the discharger from his liabilities under Federal, State, or local laws, nor guarantee the discharger a capacity right in the receiving waters.
4. This Board will prescribe more restrictive requirements for this waste discharge if necessary:

To achieve or maintain dissolved oxygen concentration of at least 5.0 mg/l in tidal waters of the San Francisco Bay System pursuant to Resolution No. 67-30,

To protect shellfishing areas which the Board designates pursuant to Resolution No. 803,

To protect the beneficial water uses, and to achieve other objectives adopted in the resolutions cited above.

5. This Board will review these requirements periodically, as required by law, and will notify the responsible persons before doing so. (Reference: Section 13263(e), California Water Code.)
6. The water quality parameters used in this resolution are as defined in the latest edition of "Standard Methods for the Examination of Water and Wastewater" by the American Public Health Association.
7. The discharger is advised that this Board will use the general concepts of Phase I of the plan recommended by the Final San Francisco Bay-Delta Program Report as guidelines in reviewing any application for construction grants for sewerage facilities proposed to comply with these requirements, and if the discharger intends to make such application he must demonstrate the compatibility of the proposed facilities with the general concepts of the Bay-Delta Program.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

September 11, 1972

REPORTING REQUIREMENTS

1. This Board requires the discharger to file technical reports on self-monitoring work performed according to detailed specifications developed pursuant to the Regional Board's Resolution No. 70-43. (Reference: Sections 13267(b) and 13268, California Water Code.)

2. This Board requires the discharger to file a written report within 90 days after the average dry-weather waste flow for any month equals or exceeds 80% of the design capacity of his waste treatment and/or disposal facilities. The discharger's senior administrative officer shall sign a letter which transmits that report and certifies that the policy-making body is adequately informed about it. The report shall include:

Average daily flow for the month, the date on which the instantaneous peak flow occurred, the rate of that peak flow, and the total flow for that day.

The discharger's best estimate of when the average daily dry-weather flow rate will equal or exceed the design capacity of his facilities.

The discharger's intended schedule for studies, design, and other steps needed to provide additional capacity for his waste treatment and/or disposal facilities before the waste flow rate equals the capacity of present units. (Reference: Sections 13260, 13267(b) and 13268, California Water Code.)

3. This Board requires the discharger to file a time schedule for engineering studies on facilities needed to comply with the Board's receiving water objective of 5.0 mg/l of dissolved oxygen and/or to file a time schedule for deciding upon the feasibility of participating in regional water quality control systems, if he does not meet that dissolved oxygen objective after providing waste treatment facilities which comply with the effluent BOD requirement prescribed elsewhere in this Resolution. (Reference: Sections 13267(b) and 13268, California Water Code.)
4. This Board requires the discharger to file technical reports on studies into correcting violations of the Board's water quality objectives caused by discharging combined storm water and sewage. Specifications for these studies shall be developed pursuant to the Board's Resolution No. 70-43. (Reference: Sections 13267(b) and 13268, California Water Code.)
5. This Board requires the discharger to file written reports within 15 days after each calendar quarter to include:

Name of and number of lots in each subdivision for which an application has been received for connection to the sewerage system. Anticipated date of connection of each subdivision to the sewerage system.

Finding and supporting data by governing body on effect of addition of each subdivision on violation of waste discharge requirements.

(Reference: Section 11551.6 Business and Professions Code and Sections 13267(b) and 13268, California Water Code.)

6. This Board requires the discharger to file a report on waste discharge at least 120 days before making any material change or proposed change in the character, location or volume of the discharge. (Reference: Sections 13260(b) and 13264, California Water Code.)
7. This Board requires the discharger to file a written technical report at least 15 days prior to advertising for bids on any construction project which would cause or aggravate the discharge of waste in violation of these requirements; said report to describe the nature, costs, and scheduling of all actions necessary to preclude such discharge. In no case should any discharge of sewage bearing wastes be permitted without at least primary treatment and chlorination. (Reference: Sections 13267(b) and 13268, California Water Code.)
8. This Board requires the discharger to file, within 90 days after the date of this Order, a technical report on his preventive (fail-safe) and contingency (cleanup) plans for controlling accidental discharges, and for minimizing the effect of such events. The plan should:

Identify the possible sources of accidental loss, untreated waste bypass, and contaminated drainage. Loading and storage areas, power outage, waste treater outage, and failure of process equipment, tanks and pipes should be considered.

Describe facilities and procedures needed for effective preventive and contingency plans.

Give the date on which such facilities as now exist became operational, and the schedule for those to be provided.

Evaluate the effectiveness of present facilities and procedures.

Predict the effectiveness of the proposed facilities and procedures.

(Reference: Sections 13267(b) and 13268, California Water Code.)

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ATTACHMENT TO ORDER NO. 73-40

REQUIREMENTS AND RECOMMENDATIONS OF OTHER AGENCIES

Other concerned agencies have requested the inclusion of the following additional requirements which are not directly related to water quality:

Their concerns are indicated in the attached letters:

1. Letter dated June 12, 1973 from the Contra Costa County Health Department addressed to the Regional Board.
2. Memorandum dated June 8, 1973 from the State Department of Fish and Game addressed to the Regional Board.



HEALTH DEPARTMENT

CALIFORNIA REGIONAL WATER

JUN 14 1973

QUALITY CONTROL BOARD

CONTRA COSTA COUNTY

Post Office Box 871, Martinez, California 94553 Telephone: 228-3000

June 12, 1973

DD PDA

Regional Water Quality Control Board
San Francisco Bay Region
364 - 14th Street
Oakland, California 94612

Attention: Mr. Roger B. James
Chief of Operations Division

Dear Mr. James:

Reference your file No. 2119.1035, Notice - Proposed Waste Discharge Requirements, Richmond Sanitary Service, Contra Costa County, dated May 14, 1973, we are submitting the following comments for consideration:

1. Undiked areas not presently containing waste material to remain status quo to preserve the waters and shoreline for the preservation of fish and wildlife recreational use in inland waters.
2. Page 4, Add item 17 - Medical wastes shall require special handling to minimize the risk of hazard and exposure to the operator and to the public by disposing of such waste in specific areas and provide for immediate cover. no
3. Page 4, item 18 - add - Local Health Department may impose requirements stricter but not less than the State as related to water quality, however, other requirements must be met as required by the local health department on all matters related to public health and safety. no
4. Page 6, item 11 - add after first sentence: Copies of such records shall be duly on file with the State Department of Public Health, local health departments and fire departments having jurisdiction for Group I waste received that day at the site, the manner and location of disposal. no

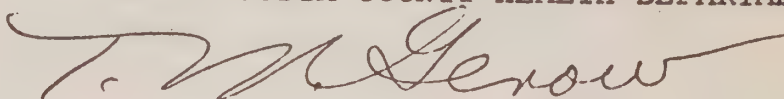
5. Page 6, item 12 - add "Richmond Sanitary . . . management, and local health departments, regarding . . . personnel. *OK*

We concur with the rest of the requirements as proposed and share the same concerns. Your discharge requirements should explicitly point out that they apply to water quality only and are not to be construed to relieve the operator in any way of compliance with any other lawful order or statute of the State of California or local government entity. Further this department concurs in the remarks as set forth by the Department of Public Health memorandums dated April 11, 1973 and June 4, 1973.

If you have any questions or we could be of any further assistance in this matter, please give us a call.

Sincerely,

CONTRA COSTA COUNTY HEALTH DEPARTMENT



T. M. Gerow, P.H.E., Chief
Division of Environmental Health

TMG:RC:b1

cc: State Health Department,
Bureau of Solid Waste Management

Memorandum

To : California Regional Water Quality Control Board
San Francisco Bay Region
364 Fourteenth Street
Oakland, California 94612

Date: June 8, 1973

Attention: Mr. Fred H. Dierker
Executive Officer

CALIFORNIA REGIONAL WATER

JUN 11 1973

QUALITY CONTROL BOARD

From : Department of Fish and Game - Region 3

Subject: Richmond Sanitary Service, Contra Costa County (Class I Dump) - Comments and Recommendations on Revised Tentative Order Prescribing Waste Discharge Requirements

Thank you for inviting our comments and recommendations on this subject.

We have reviewed the revised Tentative Order and understand that approximately one million gallons of liquid industrial wastes, sludges and other Group I materials are to be discharged to this disposal site each year, as they were in 1971.

As long as the discharger complies with the restrictions imposed by your Tentative Order, especially those requiring leachate and surface run-off controls, the fish and other aquatic life will be adequately protected from water quality degradation.

We are, however, concerned about certain other aspects of the project which may affect wildlife, and question:

1. The use of this area as a repository for Class I materials considering that ultimate land-use plans call for conversion of this area into a park;
2. The use of this area as a Class I dump considering possible accidental contamination of the San Pablo Sanitary District's effluent channel and San Pablo Creek. Pesticides, waste chemicals, and other Group I wastes may enter these waters which traverse the site; and
3. The lack of provisions to discourage or preclude waterfowl and other wildlife from contact with toxic materials, especially considering the close proximity of the site to viable marshland.

Although we feel that strict enforcement of the proposed requirements will adequately protect the aquatic life of the area from water quality degradation, wildlife are still lost in open Class I disposal areas such as this. We believe the losses of such wildlife constitute a nuisance as defined in Division 7, Chapter 2, Section 13020(m) of the Water Code.

California Regional Water Quality Control Board
San Francisco Bay Region

June 8, 1973

Wildlife are considered the property of the people of the State and such losses interfere with the comfortable enjoyment of life or property and obstructs the free use of such property.

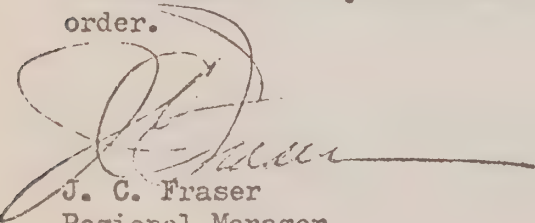
Of further importance in this matter is Division 20, Chapter 6.5 of the Health and Safety Code which states in part:

"25100. The Legislature finds that increasing quantities of hazardous wastes are being generated in the state and that without adequate safeguards for handling and disposal, such wastes can create conditions which threaten the public health and safety and create hazards to wildlife."

"25101. The Legislature therefore declares that in order to prevent such hazardous conditions it is in the public interest to establish regulations and to maintain a program to provide for the safe handling and disposal of hazardous wastes."

"25117. 'Hazardous waste' means any waste material or mixture of wastes which is toxic, corrosive, flammable, an irritant, a strong sensitizer, which generates pressure through decomposition, heat or other means, if such a waste or mixture of wastes may cause substantial personal injury, serious illness or harm to wildlife, during, or as a proximate result of any disposal of such wastes or mixture of wastes....."

Therefore, with these points in mind, we recommend your Board include a provision which requires the discharger to incorporate physical features in the project that will prevent wildlife from entering areas of toxic waste containment. Only with such an inclusion can we concur with your tentative order.



J. C. Fraser
Regional Manager
Region 3

cc: Department of Water Resources
Central District Headquarters
Department of Public Health, Berkeley
Environmental Services Branch



cooper & clark associates

FOUNDATION ENGINEERS • CIVIL ENGINEERING GEOLOGISTS

Robert S. Cooper
Principal Engineer
Robert S. Clark
Principal Engineer
William W. Brewer
Principal Engineer
Norman Gurin
Principal Engineer
John M. Pilling
Principal Engineer
Jeff F. Fagan
Principal Engineer

August 30, 1972

Our Job No. 1269-A5

Dana Murdock, Attorney at Law
Post Office Box 4713
Walnut Creek, California

Dear Mr. Murdock:

Consultation
Re: Interim Remedial Measures
Existing Class 2 Disposal Areas
West Contra Costa County Sanitary Landfill
Richmond, California
For The Richmond Sanitary Service

INTRODUCTION

This report presents our recommendations for interim remedial measures for the existing Class 2 disposal area at the captioned site in Richmond, California. The existing Class 2 disposal area comprises approximately 250 acres located near the foot of Parr Boulevard. The site layout is shown on the attached site plan.

The Regional Water Quality Control Board (WQCB) has required that the existing Class 2 area be investigated to determine the adequacy of the perimeter dikes and the acceptability of present disposal operations, and to develop methods of upgrading the site, if required, to meet current pollution control requirements. Since the extent of future disposal operations at this site will depend on the results of hearings before BCDC and the Corps of Engineers, it was agreed with Mr Dalke of the WQCB staff that a detailed soil investigation, involving subsurface exploration, laboratory testing, and engineering analyses, was not warranted at this time. However, the WQCB staff has requested that interim soil engineering studies be performed at this time to provide some assurance that the existing disposal operations are not causing pollution of adjacent waters or creating other health hazards.

The purpose of our studies was as follows:

1. Examine all existing perimeter slopes around the Class 2 disposal area for visual evidence of instability, outward seepage of leachate, inward seepage of adjacent waters or inadequate cover.

2. Based on this inspection, recommend interim remedial measures, if required, to control pollution, health hazards, rodents or vermin, or other public nuisances.
3. Examine the surface of all areas filled with Group 2 wastes for adequacy of intermediate cover, proper drainage to avoid ponding of water, and the existence of rodents, flies, vermin or other health hazards.
4. Based on our inspection of the existing filled areas, recommend interim remedial measures, if necessary, to bring these areas to acceptable standards.
5. Review the current disposal operations, with particular emphasis on the following: method of dumping, adequacy of watering and compactive effort, thickness of lifts, width of working face, amount and type of intermediate and daily cover, location of public dumping areas with respect to other operations, and adequacy of control of blowing papers and other nuisances.
6. Based on our review of current disposal operations, recommend whatever changes in procedures appear to be necessary to bring these operations into conformance with accepted good standards.

DISCUSSION

An examination of the perimeter slopes around the Class 2 disposal area indicated little or no problem with slope stability. However, the thickness of cover material over portions of these slopes should be increased. The above observations also apply to the outflow channel which originates at the sewage treatment plant and runs through the center of the site. Inward seepage may be occurring from the isolated pond, adjacent to the bay in the northerly portion of the site. The location of this pond is shown on the attached site plan.

An examination of the completed surface of the existing fill area indicates that portions of the area have inadequate cover. In addition, the surface is quite irregular and is not graded to properly drain surface waters. Therefore, rainwater tends to pond and seep into the underlying sanitary fills.

Present refuse disposal operations were observed on several occasions. The method of dumping, thickness of lifts, compactive effort, amount of daily cover, location of public dumping areas with respect to other operations, and adequacy of control of blowing papers and other nuisances were all noted. Both private and public disposal operations are located in the same area, and demolition debris is disposed of in an adjacent area. The dumped refuse and demolition debris are bulldozed in such a manner as to slope the working face. We understand that the Operator has purchased a Compactor which should provide adequate compaction.



However, no defined thickness of lift of sanitary fill has been established. There presently are no barriers to restrict blowing paper, and watering of haul roads is not done on a systematic and sufficiently frequent basis. We understand that dumping of refuse is done on a 24-hour basis, intermediate cover is provided, but no daily cover is placed on the working face. Our various inspections disclose that seagulls, insects and vermin present only a minor problem.

RECOMMENDATIONS

SLOPES:

Assuming that the existing perimeter slopes are temporary, it is recommended that, when required, existing cover be supplemented to provide a minimum of one foot of earth fill. Along portions of the perimeter slopes, it may be possible to excavate bay mud deposits outboard from the toe of the slopes to a shallow depth by means of a dragline and to deposit the excavated material on the slope face. The excavations should not be deeper than 2 feet. If this method is used, the cover thickness should be increased to approximately 18 inches, and after it has dried it should be "track-walked" with a lightweight bulldozer. As an alternate to the use of drag-lined bay mud for cover material, dry fill could be placed on the slope and then spread and tracked with lightweight dozers.

Sealing of the outflow channel from the sewage treatment plant, where required, should be accomplished by the use of dry fill placed on the slope and spread and tracked with construction equipment. Dressing of the slopes with material dredged from the channel is not recommended due to the necessity of maintaining a proper flow-line gradient to the bay.

EXISTING POND:

It is recommended that the isolated pond in the north portion of the site, as shown on the attached site plan, be pumped dry and filled with Group 2 fills. The perimeter slope of this new fill should then be covered as previously discussed. Unless this small ponded area is dewatered and filled, it is our opinion that health hazards and insect problems caused by the contaminated and stagnant water could develop.

EXISTING FILLED AREAS:

The completed surface of the already filled areas should be graded to drain properly. It is recommended that additional lifts of Group 2 or Group 3 materials be placed so that the completed surface will properly drain all rainwaters. Since final elevations are not known at this time, it is recommended that the graded surface be covered by at least one foot of properly compacted, relatively impermeable soil. Because of its high shrinkage characteristics, bay mud is not recommended for use in this intermediate cover.



CURRENT OPERATIONS:

It is recommended that the following measures be taken to improve current disposal operations:

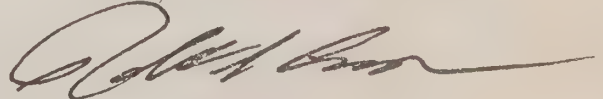
1. The thickness of each lift of refuse should be limited to a maximum of fourteen feet.
2. The width of the working face should be kept as narrow as possible, and, if feasible, public and private dumping operations should be separated.
3. Barriers to capture blowing papers should be erected and cleaned at regular intervals.
4. The working face should be periodically covered with inert material. The sludge material which is disposed of at the site could be used as daily cover, but because of the noncohesive and permeable nature of this material when it dries, additional cover material should be used at intervals of from two to three days. This periodic cover of the working face should consist of an impermeable material at least six inches in thickness. Intermediate cover should be provided over the top of each lift of refuse. This intermediate cover material, as discussed previously, should be at least one foot thick when compacted and should consist of an impermeable, inert material.

The above recommended remedial measures may require modification in the field to meet individual situations. One of our field engineers should make periodic inspections of the site during the recommended remedial work to determine compliance with these recommendations and to suggest modifications, if required.

We trust that this letter provides the information which you require at this time.

Yours very truly,

COOPER, CLARK & ASSOCIATES



ROBERT S. COOPER

RSC/kw
(3 copies submitted)

Attachment

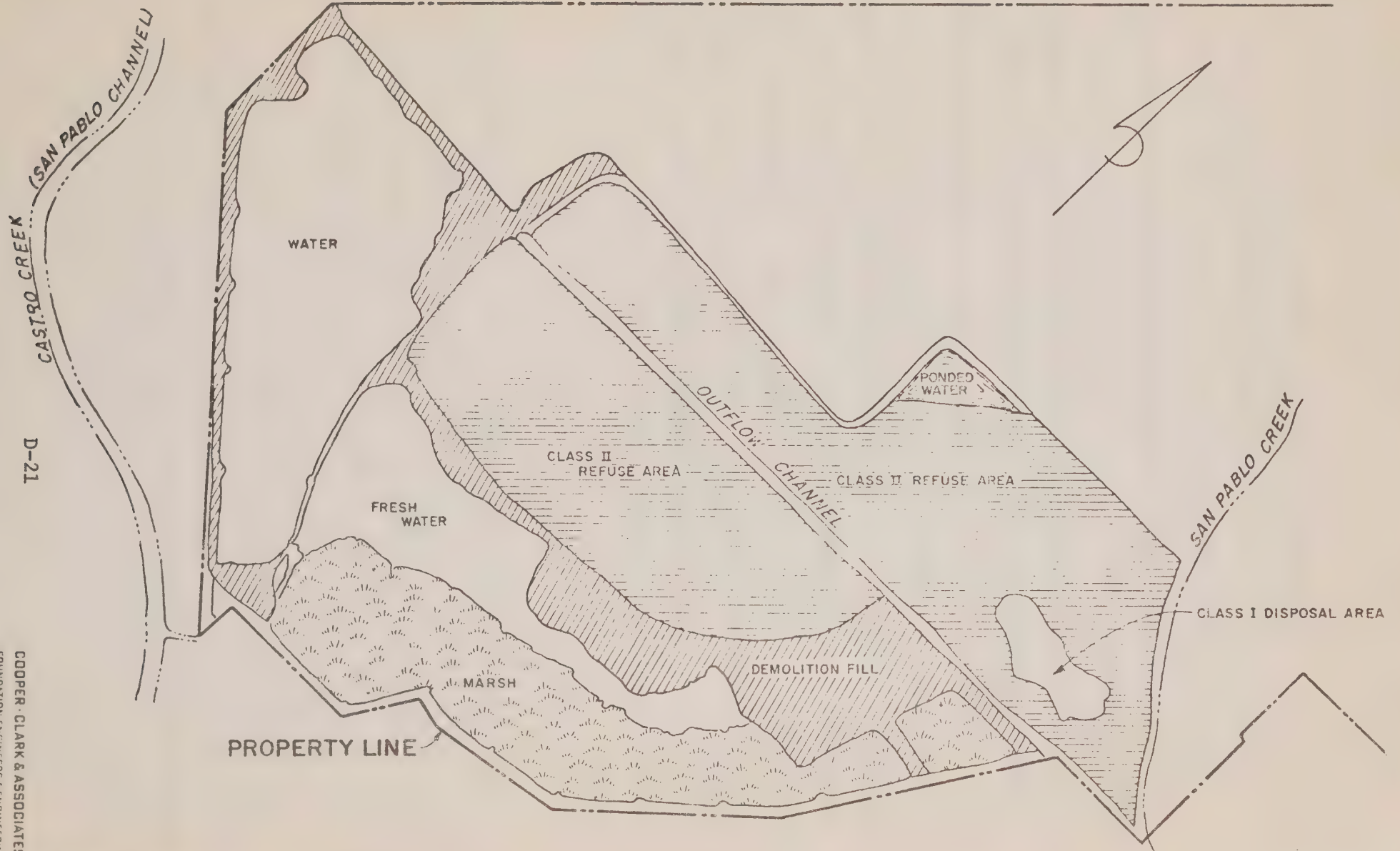
3cc: Richmond Sanitary Service
Attention: Richard Granzella, President

1cc: Kister, Savio & Rei
Attention: Mr. Mike Rei

2cc: Regional Water Quality Control Board
Attention: Mr. Donald W. Dalke

D-20





D-21

COOPER, CLARK & ASSOCIATES

NOTE:
 MAJOR PORTIONS OF INDICATED FILL AREAS
 ARE TAKEN FROM AERIAL PHOTOGRAPH DATED 8-19-71



SUGGESTED PROCEDURES & SPECIFICATIONS
FOR
OPERATION OF THE BARREL STORAGE AREA

Following completion of grading for the barrel storage area, the only significant outside source of water will be from rain falling directly on the area. The bottom of the excavation and the cover over each course of stockpiled barrels should be sloped to drain to a low point. Rain water should not be allowed to pond to such a depth that it closely approaches the stockpiled barrels. All collected water should be either discharged into the existing waste disposal pond or sprayed on the surface of the adjacent sanitary fills. In no event should the collected water be discharged into the nearby effluent channel or otherwise off of the site. If leachate is obviously seeping from the stored barrels, it should be collected and discharged into the liquid waste pond. Also, the seepage area should be confined by placing a proper thickness of compacted impermeable fill, as directed by the Soil Engineer.

In order to minimize the possibility of spillage of the barrelled wastes, it is suggested that the barrels be off-loaded from the trucks and placed directly in the disposal stockpile. The barrels could be stockpiled by means of a front-end loader, a crane or other suitable construction equipment.

Each course of stockpiled barrels should be covered with at least one foot of inert fill. If this thickness proves insufficient to support the disposal equipment, it should be increased in consultation with the Soil Engineer.

Empty bags and other readily collapsible containers should be placed and immediately covered with either barrels or inert soil cover to prevent blowing and to minimize contact with equipment and personnel. Empty or partially full barrels should be handled the same as full barrels.

The maximum permissible elevation of the stockpiled barrels is 8 feet. It is recommended that a complete course of barrels be placed before a second course is started. After the disposal area has been filled to elevation 8 feet, it should be blanketed with 5 feet of properly compacted, impermeable fill. If bay mud is used for this cover, it should be compacted to at least 80 percent as determined by ASTM Test D1557-70. If other impermeable material is used for the cover, our office should be contacted for compaction criteria. Subsequent to placing the impermeable cover, the area should be covered with Group 2 or Group 3 wastes.

Source: Cooper, Clark & Associates,
August 1972

STANDARD OF OPERATION AIMED AT
ELIMINATING FIRE

1. Each load of trash brought in by the public shall be inspected by a responsible dump operator.
2. Containers of ashes will not be emptied into general trash.
3. Sewage and sludge will not be deposited with trash and general debris.
4. The face of the working fill shall be kept as narrow as is consistent with proper operation of trucks and equipment so that the area of waste material exposed during the operating day will be at a minimum. The maximum exposed active operating face shall at no time exceed 100 feet in length per piece of operating earth-moving equipment (D-6 and D-8) and 300 feet in length per 35-ton 4-wheel compactor. For example, if Richmond Sanitary Service has working on any given day their D-6, D-8 and 35-ton 4-wheel compactor, then the working face shall not exceed 500 feet in length. However, if experience demonstrates that the 500 feet of exposed working face is too much for the three pieces of equipment to handle without fire problems, BAAPCD reserves the right to modify that provisions.
5. Refuse shall be deposited in thin layers of approximately 12 to 18 inches of compacted thickness. The fill density shall be such that the compacted volume of the fill will be approximately one-fourth of the original refuse volume. The total compacted depth of refuse in any one cell shall not exceed 14 feet, including cover.

6. The exposed compacted surface of all fills which contain garbage and putrescible wastes shall be covered with 8 to 12 inches of earth as follows: The exposed horizontal lift surface shall be covered once in every 24 hours, preferably at the end of each operating day; the exposed lift face shall be covered at intervals of 50 horizontal feet (by way of illustration, if the lift surface grows at the rate of 10 horizontal feet per day, then the lift face would have to be covered every 5 working days).
7. The surface of fills which contain Class I refuse shall be covered with 8 to 12 inches of earth, preferably at the end of each working day, but in no instance later than 24 hours after the close of each day's operation.
8. Bulky waste material such as tree trimmings, tree stumps, waste building materials and concrete shall be incorporated within the fill and shall not be placed at or near the final surface or side slopes.
9. When a trench or dump area is completed, all faces shall be given a final dressing of cover to a total depth of 24 inches of compacted cover.
10. Cracks, depressions and erosions on surface and side slopes shall be promptly repaired.
11. An adequate water supply under pressure shall be maintained near the working face for fire fighting purposes.
12. Auxiliary fire protection equipment maintained in good working condition shall be provided at the dump site at all times.

13. Burning of garbage, oil, pipe wrapping, wire insulation, or other combustible refuse shall not be permitted.
14. Sufficient stand-by equipment shall be readily available to prevent delay in covering due to breakdowns or peak loads.
15. There shall be an area set aside for wet weather operations. In conjunction with this area, a stockpile of sufficient cover material should be available. Also, access roads should be all-weather roads.
16. The migration of organic gas and/or other odorous gas shall be controlled as necessary to prevent creation of a nuisance.

SOURCE: Murdock, 26 June 1974

APPENDIX E

AIR QUALITY

APPENDIX E

AIR QUALITY

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AIR QUALITY

E.01. General. The Clean Air Act amendments of 1970 established controls on the emission of harmful substances into the air. These harmful substances are cumulatively referred to as air pollution.

E.02. Air pollutants are usually divided into two classes: particulate matter (either solid or liquid), and the various pollutant gases. Dust, mist, ash, smoke, and fumes are some of the common names given to liquid or solid particles which are introduced into the atmosphere. The sources of these range from heavy industry to private residential burning and include automobile exhaust. Among the most important of the pollutant gases are carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), and various organic compounds (OX).

E.03. Carbon monoxide is an odorless, invisible gas which affects the health of people exposed to high concentrations over a period of time. About 95% of the Bay Area's carbon monoxide comes from automobiles.

E.04. Sulfur dioxide can damage vegetation and affect the health of humans and animals. A primary source is the heating and burning of fossil fuels like coal and oil.

E.05. Nitrogen dioxide is a gas which can be seen in concentrations on the horizon as a brown haze. High concentrations can damage vegetation and possibly affect the pulmonary system. Most of the nitrogen dioxide in the Bay Area is produced by automobile exhaust.

E.06. Organic compounds enter into a reaction in the atmosphere with oxides of nitrogen creating photochemical smog. This smog damages vegetation, causes eye irritation, and reduces visibility. Organic compounds are released into the atmosphere through the burning of fuels and organic waste materials.

E.07. Air Quality Data (1968-1973). From 1969 through 1973 air quality measurements of suspended particulates, sulfur dioxide, oxidant and nitrogen dioxide have all shown improvement in the Bay Area (BAAPDD, 1974a). Table E-1 presents a comparison of air quality data from 1969 to 1973 for the Bay Area Air Pollution Control District (BAAPCD) air monitoring station at Richmond.

E.08. Two sets of data on suspended particulate levels are shown in the table. The first is the annual geometric mean concentration (with a State standard of 60 $\mu\text{g}/\text{m}^3$); the second is the percentage of days during which the 100 $\mu\text{g}/\text{m}^3$ twenty-four hour State standard was exceeded. The data show a general improvement in air quality relative to particulate matter from 1969 through 1973. However, while the particulate level in 1973 is lower than the highest annual values of the 1969-1971 period, the 1973 level is higher than either the 1971 or 1972 level.

E.09. Sulfur dioxide data are averaged from 24-hour measurements. There were dramatic reductions in 1970 and in 1972, both related to tightening of the BAAPCD's Regulation 2. Regulation 2 instituted direct controls on smoke and particulate matter, lead, nitrogen oxides, sulfur dioxide, sulfuric acid, and certain odorous substances from industrial and commercial sources and organic gases from incinerators. The 1973 values showed a 35% rise over the 1972 measurements, resulting from the energy crisis curtailment in natural gas and the increased use of sulfur-containing fuels. The increase was still below the high 1969 value. The State standard (0.04 ppm for 24 hours) was exceeded only one day for the entire district and that was at Richmond.

E.10. The table lists the number of days on which oxidant concentrations exceeded 0.10, 0.15, and 0.20 ppm at the Richmond station and for the District as a whole. Also for 1972 and 1973 the days exceeding 0.08 ppm are given since a Federal standard was established at this level. For the District as a whole, the days of oxidant over each indicated level were more frequent in 1973 than in 1972, however, the increase of some 10% in oxidant experience is primarily a result of meteorological conditions.

E.11. There is no strong trend in the nitrogen dioxide experience in the Bay Area from 1969 through 1973. The decrease in 1971 probably result in large part from the same meteorological factors that caused a corresponding oxidant decrease that year.

E.12. Air Quality Data (1974). Table E-2 presents a comparison of air quality data from January through July 1974. In general, the trends appear to be the same as seen in Table E-1.

E.13. Air Quality Standards. Air Quality Standards set limits on the amount of various types of air pollution which should be tolerated in the air people breathe. Standards are set both by individual states and by the Federal government. Wherever there is some variation between State and Federal Air Quality Standards, the strictest one applies. The State Air Quality Standards are shown on Table E-3.

E.14. Table E-3 summarizes the number of days that State standards were exceeded. The sulfur dioxide 24-hour standard was exceeded at Richmond in February probably due to a strong nocturnal radiation inversion coupled with a strong northeasterly gradient wind.

REFERENCES

Bay Area Air Pollution Control District (BAAPCD). 1974a. Comparison of Air Quality Data, 1969-1973, Special Report 4-30-74. San Francisco, California.

Bay Area Air Pollution Control District (BAAPCD). 1974b. Contaminant and Weather Summary. A monthly report. San Francisco, California.

TABLE E-1

AIR QUALITY DATA (1969-1973)*1. Suspended Particulates (μgm^{-3})^{1/}

Annual Geometric Mean (A.G.M.)

| | <u>1969</u> | <u>1970</u> | <u>1971</u> | <u>1972</u> | <u>1973</u> | <u>Standard</u> |
|----------|-------------|-------------|-------------|-------------|-------------|-----------------|
| Richmond | 57 | 56 | 44 | 41 | 45 | 60 |

% Days Over 100 μgm^{-3}

| | | | | | | |
|----------|------|-----|-----|-----|-----|--|
| Richmond | 15.4 | 8.2 | 0.6 | 5.5 | 5.4 | |
|----------|------|-----|-----|-----|-----|--|

2. Sulfur Dioxide (ppm)^{2/}

| | <u>1969</u> | <u>1970</u> | <u>1971</u> | <u>1972</u> | <u>1973</u> | <u>Standard</u> |
|----------|---------------------|-------------|-------------|-------------|---------------------|-----------------|
| Richmond | .0081 ^{3/} | .0058 | .0057 | .0048 | .0065 | .04 |
| District | .0057 | .0030 | .0027 | .0019 | .0024 ^{4/} | .04 |

3. Oxidant (ppm)

| | <u>1969</u> | | | <u>1970</u> | | | <u>1971</u> | | |
|----------|-------------|------------|------------|-------------|------------|------------|--------------|-------------|------------|
| | <u>.10</u> | <u>.15</u> | <u>.20</u> | <u>.10</u> | <u>.15</u> | <u>.20</u> | <u>.10</u> | <u>.15</u> | <u>.20</u> |
| Richmond | 13 | 0 | 0 | 20 | 4 | 1 | 7 | 2 | 1 |
| District | 144 | 72 | 32 | 106 | 43 | 16 | 65 | 27 | 10 |
| | <u>1972</u> | | | <u>1973</u> | | | at .08 level | | |
| | <u>.10</u> | <u>.15</u> | <u>.20</u> | <u>.10</u> | <u>.15</u> | <u>.20</u> | <u>1972</u> | <u>1973</u> | |
| Richmond | 7 | 0 | 0 | 9 | 2 | 0 | 12 | 11 | |
| District | 61 | 16 | 7 | 81 | 30 | 8 | 89 | 99 | |

TABLE E-2

AIR QUALITY DATA (JAN-JUL, 1974)*1. Suspended Particulate (μgm^{-3})

| | <u>JAN</u> | <u>FEB</u> | <u>MAR</u> | <u>APR</u> | <u>MAY</u> | <u>JUN</u> | <u>JUL</u> |
|----------|------------|------------|------------|------------|------------|------------|------------|
| Richmond | 34 | 40 | 44 | 41 | 58 | 46 | 51 |

2. Sulfur Dioxide (ppm)

| | | | | | | | |
|----------------|------|------|------|------|-------|-------|-------|
| Richmond (max) | .030 | .041 | .024 | .021 | .017 | .007 | .010 |
| Richmond (av) | .013 | .011 | .008 | .007 | .0069 | .0031 | .0032 |

3. Oxidant (ppm)

| | | | | | | | |
|----------------|------|------|------|-----|------|------|------|
| Richmond (max) | .04 | .07 | .04 | .05 | .06 | .04 | .06 |
| Richmond (av) | .018 | .047 | .026 | .03 | .033 | .025 | .028 |
| Richmond D>.08 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| District (max) | .06 | .08 | .09 | .12 | .20 | .24 | .25 |
| District D>.08 | 0 | 0 | 1 | 5 | 14 | 20 | 21 |

4. Nitrogen Dioxide (ppm)

| | | | | | | | |
|----------------|------|------|------|------|------|------|------|
| Richmond (max) | .10 | .14 | .09 | .10 | .09 | .10 | .06 |
| Richmond (av) | .058 | .060 | .046 | .047 | .042 | .036 | .031 |
| District (max) | .11 | .19 | .15 | .20 | .10 | .14 | .20 |

5. Carbon Monoxide (ppm)

| | | | | | | | |
|----------------|-----|-----|-----|-----|-----|-----|-----|
| Richmond (max) | 10 | 8 | 8 | 5 | 4 | 3 | 3 |
| Richmond (av) | 5.9 | 4.6 | 3.7 | 3.3 | 2.5 | 2.4 | 2.0 |
| District (max) | 23 | 21 | 13 | 12 | 7 | 7 | 10 |

*Source: BAAPCD, 1974b

TABLE E-3

NUMBERS OF DAYS STATE STANDARDS WERE EXCEEDED (1974)*

| | <u>JAN</u> | <u>FEB</u> | <u>MAR</u> | <u>APR</u> | <u>MAY</u> | <u>JUN</u> | <u>JUL</u> |
|-----------------------|------------|------------|------------|------------|------------|------------|------------|
| <u>OX</u> | | | | | | | |
| Richmond District | 0 0 | 0 0 | 0 1 | 0 5 | 0 14 | 0 20 | 0 21 |
| <u>CO</u> | | | | | | | |
| Richmond District | 0 7 | 0 6 | 0 0 | 0 0 | 0 0 | 0 0 | 0 0 |
| <u>NO₂</u> | | | | | | | |
| Richmond District | 0 0 | 0 0 | 0 0 | 0 0 | 0 0 | 0 0 | 0 0 |
| <u>SO₂</u> | | | | | | | |
| Richmond District | 0 0 | 1 1 | 0 0 | 0 0 | 0 0 | 0 0 | 0 0 |
| <u>SP</u> | | | | | | | |
| Richmond District | 0 0 | 0 1 | 0 0 | 0 2 | 0 4 | 0 4 | 0 6 |
| <u>SP AGM</u> | | | | | | | |
| Richmond | 44 | 44 | 44 | 43 | 43 | 42 | 41 |

*SOURCE: BAAPCD, 1974b

4. Nitrogen Dioxide (ppm)

| Annual Average | | | | | | |
|--------------------|-------------|-------------|-------------|--------------------|-------------|-----------------|
| | <u>1969</u> | <u>1970</u> | <u>1971</u> | <u>1972</u> | <u>1973</u> | <u>Standard</u> |
| Richmond | .035 | .034 | .021 | .029 ^{5/} | .029 | .25 |
| District | .033 | .034 | .028 | .031 | .031 | .25 |
| Days over standard | | | | | | |
| Richmond | 1 | 0 | 0 | 0 | 0 | |
| District | 7 | 9 | 2 | 2 | 1 | |

*Source: BAAPCD, 1974a

Notes: 1/ μgm^{-3} = micrograms per cubic meter (ppm)

2/ ppm = parts per million

3/ 24-hour sampling began in June 1969. Average for 1969 is for June through December.

4/ For comparability, San Rosa, Napa and Vallejo are not included.

5/ Change in sampling site during year.

CURRENT STATE STANDARDS

OX: >.08 ppm for 1 hour

CO: <40 ppm for 1 hour or
9 ppm for 8 hours

NO₂: .25 ppm for 1 hour

SO₂: .50 ppm for 1 hour or
.04 ppm for 24 hours

SP: 100 μgm^{-3} for 24 hours

SP AGM: 60 μgm^{-3} annual geometric mean

APPENDIX F

HISTORICAL AND ARCHAEOLOGICAL FEATURES

APPENDIX F

HISTORICAL AND ARCHAEOLOGICAL FEATURES

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| F-2 | Letter from California Department of Parks and Recreation (Historical Preservation Officer) to U.S. Army Corps of Engineers, San Francisco District, dated 11 January 1974. Subject: Historic resources. | F-3 |
| F-3 | Letter from U.S. Army Corps of Engineers, San Francisco District, to National Park Service dated 21 December 1973. Subject: Request for historical, archaeological, and paleontological resource review. | F-4 |
| F-4 | Letter from National Park Service to U.S. Army Corps of Engineers, San Francisco District, dated 22 January 1974. Subject: Archaeological resources. | F-6 |
| F-5 | Archaeological Survey, Richmond Sanitary Service, West Contra Costa County Dump. | F-7 |

SPNED-E

21 December 1973

Mr. William Penn Mott, Jr.

Submission of comments within thirty (30) days would be appreciated so that this statement can more fully reflect your information.

Mr. Tom Crews of our Environmental Branch (415-556-7471) has been designated to coordinate the preparation of the environmental statement and is available to respond to your queries.

Sincerely yours,

1 Inclosure
As stated

H. E. PAPE, JR.
Chief, Engineering Division

DEPARTMENT OF PARKS AND RECREATION

P.O. BOX 2390
SACRAMENTO 95811



January 11, 1974

Mr. H. E. Pape, Jr., Chief
Engineering Division
U. S. Army Corps of Engineers
San Francisco District
100 McAllister Street
San Francisco, California 94102

Dear Mr. Pape:

We have received your letter of December 21, 1973 transmitting the environmental working paper for the West Contra Costa Sanitary Landfill Project.

We stated in a December 5, 1973 letter to Mr. John F. Pedroarena of Environmental Assessment Engineering, that as staff for the State Historic Preservation Officer we have determined that there are no State Historical Landmarks, State Points of Historical Interest, or sites on the National Register of Historic Places which would be affected by the project.

We also would suggest again that you initiate a preliminary archeological field survey previous to any actual site disturbance. For information in this regard, you may contact Dr. Michael Moratto, Archeological Representative for the Society for California Archeology; A. E. Treganza, Anthropological Museum, California State University, San Francisco, 1600 Holloway Avenue, San Francisco, California 94132.

Please feel free to contact us if we may be of any further assistance.

Sincerely,

A handwritten signature in cursive script, appearing to read "Russell W. Porter".

Russell W. Porter, Chief
Grants and Statewide Studies Division

G-5/934



DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, CORPS OF ENGINEERS
100 McALLISTER STREET
SAN FRANCISCO, CALIFORNIA 94102

REPLY TO
ATTENTION OF:

SPNED-E

21 December 1973

Regional Director
National Park Service
U. S. Dept. of the Interior
450 Golden Gate Avenue
San Francisco, CA 94102

Dear Sir:

In response to the provisions of the National Environmental Policy Act of 1969, Public Law 91-190, to protect and enhance the quality of the environment, the San Francisco District is preparing a Draft Environmental Impact Statement (EIS) for the West Contra Costa County Sanitary Landfill Project. The Richmond Sanitary Service has made a permit application for confirming and approving all existing dikes and embankments, including rehabilitation, completion and permanent maintenance, and validating the placement of all existing fill and material behind these dikes and embankments; and requesting permission to continue the sanitary landfill operation behind the existing dikes and embankment in connection with future sanitary landfill operations. The Army's authority over these lands stems from the River and Harbor Act of 1899, Section 10, as interpreted in Public Notice 71-22(a), dated 18 January 1972.

In order to initiate early coordination among all concerned parties, a Working Paper for this project is inclosed for your review. This Working Paper is a preliminary evaluation of the landfill project as it might affect the environment, should not be confused with an environmental statement, and does not necessarily reflect the Corps' position on the proposed permit action. The purpose of this paper is to solicit from outside agencies and private groups as much pertinent information as is available to be incorporated into the forthcoming draft environmental statement.

It is requested that a review of historical, archeological and paleontological resources be conducted by your office regarding the effect this project may have upon those within the project area. Your response and

SPNED-E
Regional Director

21 December 1973

comments will be considered in the preparation of the draft environmental statement. Submission of comments within thirty (30) days would be appreciated so that this statement can more fully reflect your views.

Mr. Tom Crews of our Environmental Branch (556-7471) has been designated to coordinate the preparation of the environmental statement and is available to respond to your queries.

Sincerely yours,

1 Inclosure
As stated (2cys)

H. E. PAPE, JR.
Chief, Engineering Division



United States Department of the Interior

NATIONAL PARK SERVICE

WESTERN REGION

450 GOLDEN GATE AVENUE, BOX 36063
SAN FRANCISCO, CALIFORNIA 94102

IN REPLY REFER TO:

L7619

(WR)PSE

January 22, 1974

Mr. H. E. Pape, Jr.
Chief, Engineering Division
Corps of Engineers
100 McAllister Street
San Francisco, California 94102

Dear Mr. Pape:

We have reviewed the environmental working paper on the West Contra Costa County Sanitary Landfill Project and submit the following comments for your consideration. These comments should be considered as technical input for your working paper, and do not represent the official comments of the Department of the Interior nor the National Park Service on your proposed environmental impact statement.

According to our records, two large unexcavated Indian shell midden sites are near the vicinity of the proposed landfill area. These are CCo-273 located approximately 3/4 mile to the southeast, and CCo-275 located less than one mile to the southwest of the project area. Due to the nature of the terrain, an archeological survey of the project area most likely would not reveal cultural manifestations on the surface of the ground. However, the closeness of the above two sites indicates that the potential is high for subsurface archeological resources to be present in the project area.

We suggest that in the event archeological materials are exposed during earth moving activities (e.g. road and dike construction), a professional archeologist be contacted immediately to allow examination and evaluation of these resources. Either the Treganza Museum of California State University at San Francisco or the Department of Anthropology of the University of California at Berkeley could be contacted for this purpose.

Sincerely yours,

Bruce M. Kilgore
Associate Regional Director,
Western Region



Archeological Survey
Richmond Sanitary Service
West Contra Costa County Dump

by

Ann S. Peak
Consulting Archeologist

for

Environmental Assessment Engineering

February 8, 1974

Department of Parks and Recreation, Cultural Resources Section. The National Register of Historic Places, the California Historical Landmarks Register, and the California Points of Historic Interest were consulted at the California State Department of Parks and Recreation, Historic Preservation section.

The research revealed that there were no archeological sites or historic landmarks known or recorded within the project boundaries. Several archeological sites are recorded as extant in areas adjacent to the dump site with CCo-273 and CCo-275 respectively 3/4 mile southeast and 1 mile southwest of the project area. Several mounds which were known to have been located on San Pablo and Wildcat Creek, east of the dump site, had disappeared by 1909 (Nelson 1909).

Field Survey

The site of the proposed dump facilities expansion at Richmond was field examined on January 29, 1974. With the exception of the retaining levee on the easterly and southern perimeters and a narrow strip of marshy land at the levee toe, the area is inundated by apparently stagnant water nearly covered by floating wood debris.

Original topographic features of the area cannot be determined from observation, but it is likely that the depressed area was once a portion of the bay flats or marshes. Construction of the levee cut the area off from the bay and there may have been subsequent removal of earth which produced the present depression. The 1909 maps from Nelson's publication

The shores of San Francisco Bay are marked by numerous shell mounds or remnants of them. These mounds were produced by the Indian inhabitants deposition of shells and other debris from living activities. Through time, estimated by some archeologists to exceed 3,000 years, some of the mounds assumed depths of nearly 30 feet. Most of the shell mounds were located at the edge of the bay waters above high tide and near fresh water streams (Nelson 1909:329). Natural forces acting upon the bay region have greatly altered these locations. Subsidence of the area, ranging from 3 feet to over 18 feet (Nelson 1909:329) has in some cases lowered the mounds beneath water level where wave action has disturbed or destroyed the sites. One such example is site #266, north of San Pablo Creek, which has been completely washed away (Nelson 1909:323). Deposition of silt by both stream flow from the hills and the bay currents has extended the marshlands beyond the old village sites. Archeological sites, once at water's edge, may now be some distance inland. In some cases sites have been buried by siltation occurring at a time subsequent to abandonment by the Indian people. One such site on Point San Pedro lies in the edge of reclaimed salt marsh where it was discovered by trench construction. The clay or adobe-like covering above the cultural remains appeared to have developed through a slow colluvial deposition (Nelson 1909).

Research

Prior to the field survey, records and maps of recorded archeological sites were checked at the California State

show the area to have been substantially different in appearance. Wildcat Creek and San Pablo Creek now occupy quite divergent channels and no longer join to form a common outlet. The salt marsh has been extended beyond the 1909 outlet of San Pablo Creek while Wildcat Creek flows into the bay to the south of the old mouth.

Survey Results

There were no surface evidences to indicate the presence of archeological or historical sites within the proposed project boundaries.

Conclusions and Recommendations

Although the presence of an unknown major shell mound is unlikely on San Francisco Bay (Nelson 1909), the possibility of a buried site cannot be entirely discounted. Subsidence and siltation have continued as natural forces acting on the ancient sites to greatly alter their appearance and location in relation to topographic features present during aboriginal times of occupation.

It is recommended that construction personnel be advised of the possibility that a shell mound could be extant within the boundaries of the project. If unusual amounts of shells are uncovered during construction activities, a qualified archeologist should be consulted.

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